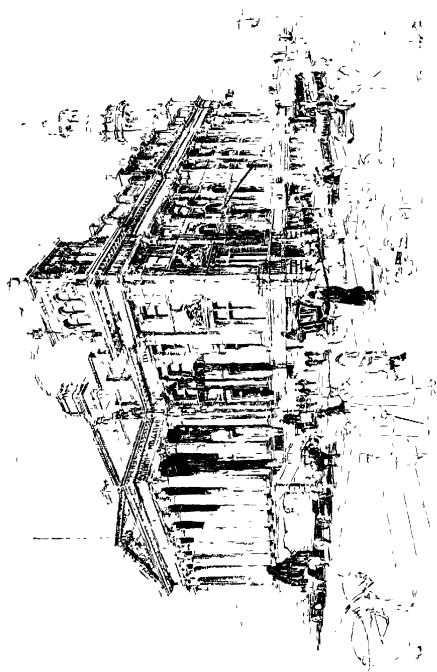


THE COTTON INDUSTRY
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TOUR DE LA VILLE DE PARIS

THE COTTON INDUSTRY AND TRADE

BY

S. J. CHAPMAN, M.A., M.COM.

STANLEY JEVONS' PROFESSOR OF POLITICAL ECONOMY, AND DEAN OF THE
FACULTY OF COMMERCE IN THE UNIVERSITY OF MANCHESTER

WITH EIGHT ILLUSTRATIONS

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PREFACE

THIS work is intended to be an elementary introduction to the economics of the cotton industry and trade. It is, therefore, descriptive to a large extent, but I have attempted here and there to trace causes and effects in a simple way, and introduce the reader briefly to some of the numerous problems that arise out of the subjects treated.

Portions of Chapters II. and III. are elementary statements of matters that will be found more fully treated in my *Lancashire Cotton Industry*. Authorities for the rest of the work are mentioned in foot-notes, but I ought particularly to mention how considerably my labours were curtailed in the preparation of Chapter V. by the use of Oppel's *Die Baumwolle*. Further, I have to express my obligations to the Editor of the *Manchester Guardian* for permission to reprint parts of two articles that appeared in that paper and to reproduce the illustration of the Manchester Exchange; to Messrs. Brooks and Doxey and Messrs. Dobson and Barlow for the loan of blocks for illustrations; and to Messrs.

Platt Brothers for the offer of blocks, which, however, could not be used when the time came for printing, as they were otherwise engaged. My wife has constructed all the tables that are not quoted from other works, and has also read through the proofs.

S. J. C

UNIVERSITY, MANCHESTER

THE COTTON INDUSTRY AND TRADE

CHAPTER I

THE RAW MATERIAL

COTTON wool is a vegetable down which grows in tropical and sub-tropical climates. Its region may be defined as the areas lying 40° north and south of the Equator. Its requirements in respect of climate and soil could not be discussed with any advantage in this brief sketch, and, as Professor Dunstan has said, the agricultural chemistry of cotton is still in its infancy.¹ The cottons known to commerce fall into two great classes, the Oriental and the Occidental, the Indian and the American, but botanically many species have been enumerated. The most important cotton-producing countries at the present time are the United States, India, Egypt, Brazil, and China; but the last produces almost entirely for home consumption. Indian cottons, which have a very short staple, are grown chiefly at Hingunghât, Oomrawuttee, Broach, Dhollera, and

¹ Good accounts of cotton, its nature, cultivation, and so forth, will be found in Brooks' *Cotton its Uses, etc.*, Dabney's *Cotton Plant* (Department of Agriculture of the United States), Foaden's *Cotton Culture in Egypt*, and Dunstan's Report on Cotton Cultivation for the British Government. A bibliography is attached to Oppel's *Die Baumwolle*.

Dharwar. At Dharwar, New Orleans seed has also been successfully raised. In India the cotton plant is reared in regions where long periods of drought are experienced, but the absence of rain for months together in these parts is rendered comparatively harmless by the character of the soil, known as black cotton soil, which is capable of retaining moisture for a long time. The quantity of cotton produced in America was not large until some time after the Revolution. the cotton used by the colonists was imported from Smyrna and Barbados. Now the quantity of cotton produced in America is enormous, and constitutes by far the most important source of supply.

Year (ending 30th June)	Average Annual Production of United States Million lbs	Average Annual Exports of United States Million lbs	Average Annual Exports of United States to Great Britain Million lbs
1790-4 .	39	5	5
1820-4 .	190	142	94
1850-4 .	1236	931	681
1880-4 .	2944	1980	1248
1890-4 .	3914	2642	1502
1899-1903 .	5245	3452	1495

The increasing proportion sent to other countries than England is noticeable. It is also noticeable that the American crop has not kept pace with the need for cotton: thus, in the years 1870-1, 1880-1, 1890-1, and 1902-3, which may be taken as fairly typical, the world's consumption of cotton in million bales advanced as follows: 4.9, 7.2, 10.3, 13.7; while the American crop, measured in the same way, moved from 4.4 in the first year to 6.6, 8.7, and 10.8 in the succeeding years mentioned above.

Sea Island cotton, which is raised along the coasts and on the islands of South Carolina and Georgia, between Charleston and Savannah, is the most valuable of all cottons grown, on account of the length, strength, and texture of its fibre. It is of an even, silky texture, and has a yellowish colour. It varies in quality from year to year with the climatic conditions under which it is raised, and requires very careful cultivation. The other variety of cotton grown in America is known as "Uplands," from the district in which it is cultivated.

Cotton was introduced into Egypt some time prior to 1820 by Maho Bey, who had been Governor of Dongola and Sennaar, and its cultivation was encouraged by Mehemet Ali. An energetic Frenchman, Jumel by name, who had observed cotton in Maho Bey's garden in 1820 and had started a plantation of his own, was placed in control of the Viceroy's cotton fields. The imported industry succeeded beyond the dreams of its originators, and to-day Egyptian cotton is highly prized and has a large market. Its cultivation is confined to the delta and the parts which allow of irrigation from the Nile. The cotton fields can be flooded periodically without the plants sustaining injury owing to the dryness of the atmosphere. From Egypt we receive now on an average some 300 million lbs. a year, that is between a quarter and a fifth of our average imports of cotton from the United States.

The cotton harvest of the world begins in August at earliest. Everywhere it is gathered by hand, but much thought has been given to the problem of mechanical harvesting, and there is little doubt that in the future machinery will take the place of the tedious method at present employed. Before the separation

of the seeds from the fibres is attempted, the wool is dried in the sun for some days. The removal of the seeds from the cotton was for years a great difficulty. The oldest device was to pass the cotton between rollers horizontally grooved, and placed sufficiently close together to prevent the passage of the seeds. This method was found to be suitable for Sea Island cotton, with its long straight staple, but not for the Upland cotton, in which the seeds are more completely embedded. Hence it was the Sea Island cotton of which the cultivation was most widely extended until the invention of the saw-gin. The following is an account of a roller machine as it was used in America for the Sea Island cotton. It is quoted by Baines from Hall's¹ travels in North America —

“It consists of two wooden rollers of about an inch in diameter, these are placed horizontally, parallel, and touching each other. Over them is fixed a sort of comb, having iron teeth two inches long and seven-eighths of an inch apart. This comb is of the same length as the roller, and is so placed that its teeth come nearly in contact with them. When the machine is set in motion, the rollers are made to revolve with great rapidity, so that the cotton being laid upon them, it is by their motion drawn in between the two, whilst no space is left for the seeds to pass with it. To detach these from the fibres of cotton in which they are enveloped, the same machinery which impels the rollers gives to the toothed instrument above a quick, wagging motion to and fro, by means of which the pods of cotton, as they are cast upon the rollers, are torn open just as they are beginning to be drawn in; the seeds, now released from

¹ *History of the Cotton Manufacture*, p. 300

the coating which had encircled them, fly off like sparks to the right and left, while the cotton itself passes between the cylinders. The sharp iron teeth of the comb, moving with great velocity, sometimes break the seeds, then the minute pieces are instantly hurried on, and pass between the rollers with the cotton. These stray particles are afterwards separated by hand, a process which is called moting. Entirely to cleanse the cotton from any remaining fragment of seed, it is subjected to another process. This consists in whisking it about in a light wheel, through which a current of air is made to pass."

From this description a good idea can be formed of the fundamental character of roller-ginning. The saw-gin, by which, for the first time, the seeds could be removed cheaply from Upland cotton, was the invention of Eli Whitney, of Westborough, in Massachusetts; it has rightly been regarded as one of the half-dozen great inventions which helped to create the great centralised cotton industry of Lancashire. The principle of the machine is well brought out in the following account of its working, which was penned early in the nineteenth century :—

"The cotton is put into a receiver, or hopper, of considerable length compared with its width, one side of which is formed by a grating of strong parallel wires, about an eighth of an inch apart. Close to the hopper is a wooden roller, having upon its surface a series of circular saws, an inch or a half apart, which pass within the grating of the hopper to a certain depth. When the roller is turned, the teeth of the saws lay hold of the locks of cotton and drag them through the wires, whilst the seeds are prevented by their size from passing

through, and fall to the bottom of the receiver, where they are carried off by a spout. The cotton is afterwards swept from the saws by a revolving cylindrical brush."¹

Machines which are modifications of Whitney's gin are in general use to-day for cleaning cotton in the Southern States, but as the system of the saw-gin has been found to injure the long-stapled cottons, a development of the roller-gin is employed for Sea Island, Egyptian, and Brazilian cottons. The roller-gin, even in its modern forms, deals slowly with the cotton to be cleaned, while the Whitney machine gins rapidly, but so roughly as to damage much of the fibre that passes through it; hence attempts, which have met with some success, are being made to improve the capacity of the former and to prevent the latter from cutting the fibres.

From the manufacturer's point of view, the value of the cotton depends upon the length, strength, and fineness of the staple. Colour is also a matter of some importance. Formerly the main distinction in cottons was drawn between "yellow" and "white," but now the two chief classes are "long-stapled" and "short-stapled." Of Sea Island cotton, the long-stapled variety of America, I have already spoken. Long-stapled cottons are obtained also from Brazil, Demerara, the West Indies, and Egypt. Manufacturers can make substitutes for many cottons by mixing different sorts.

About three-quarters of the raw cotton of the world is raised in the United States, and about half of the raw cotton exports of the world come to Great Britain. The average values of the exports from the United States to different European countries in the five years

¹ Baines' *Cotton Manufacture*, p. 301.

ending in 1896, and the five years ending in 1901, are stated beneath :—

	1892-1896.	1897-1901.
France	5 05	5 64
Germany	8 34	12 2
United Kingdom . .	23 38	23 3
Belgium	97	1 02
Italy	1 84	2 49
Russia	87	58

Raw cotton is admitted free into England, Germany, and France, but a duty is charged in Russia and Italy. In interpreting this table it must be remembered that the price of cotton has been far from stationary. The average prices of middling American cotton in the years to which the figures above relate were as follows, beginning with 1892 · $4\frac{1}{8}$, $4\frac{1}{2}$, $3\frac{1}{8}$, $3\frac{3}{4}$, $4\frac{1}{2}$, $3\frac{3}{8}$, $3\frac{1}{8}$, $3\frac{1}{8}$, $5\frac{1}{2}$, $4\frac{3}{4}$ in pence per pound. Variations in price are occasioned partly by unforeseen alterations in demand, and partly by unexpectedly good or bad crops. The yields per acre differ sometimes a good deal: between the years 1896-7 and 1903-4 the annual yields per acre were 210, 257, 249, 197, 200, 194, 200, 168 lbs. The large share of the American crop which falls to the United Kingdom is explained chiefly by the extent of our manufacture. In a much less degree it is accounted for also by the fact that, in comparison with our consumption, the consumption of the Continent includes a greater proportion of the cheap short-staple variety of cotton which is obtained from India. It has been estimated that the distribution of the Bombay crop recently was 3·3 per cent. to Great Britain, 37·5 per cent. to the continent of Europe, 15 per cent. to China and Japan, 5 per cent. to Calcutta and the coast, and 43·7

per cent. for home consumption. The increasing proportion of cotton consumed by countries other than England will receive attention later.

As regards the sources from which Great Britain draws her cotton, striking changes have taken place since the closing years of the eighteenth century. In 1786-90 the British West Indies contributed 75 per cent. of the cotton received by Great Britain; the Mediterranean countries contributed 19 per cent., Brazil 8 per cent., the United States and India less than 1 per cent., and Egypt none at all, since the cotton plant was then as rare in Egypt as snakes are in Iceland. Compare these figures with the table below.

AVERAGE QUANTITIES OF RAW COTTON IMPORTED
ANNUALLY INTO THE UNITED KINGDOM FROM
THE FOLLOWING COUNTRIES IN THE PERIOD OF
1896-1900.

	1896-1900 Million lbs
United States	1,436
Brazil	138
Peru	85
Chile (including the Pacific coast of Patagonia)	8
Venezuela and Republic of Colombia	5
British West India Islands and British Guiana	3
Turkey (European and Asiatic)	5
Egypt	2957
British possessions in the East Indies	407
Australasia	35
All other countries	23
Total	1,800
Re-exported	223

Probably the United States, India, and Egypt supply

now about four-fifths of all the cotton used in the world. They export to Great Britain something over nine-tenths of all the cotton she receives.

Large quantities of cotton now enter Manchester by the Ship Canal, but from six to eight times as much is still imported through Liverpool. The figures subjoined give the shipments through the canal from 1894 to 1902, each year being reckoned from September 1st to August 30th. A Manchester cotton-importing company is now in process of formation, or is actually formed, for increasing the importations through the canal and establishing a "spot" market in Manchester. In connection with importations through the Ship Canal it should be noted, for the benefit of those who do not know Lancashire and its industry, that the great majority of the mills are far from Manchester and that, therefore, were the bulk of the cotton used discharged at Manchester docks instead of at Liverpool docks, a "handling" would be saved in only a few cases, though in most the cost of transport by rail would be less from Manchester than from Liverpool

IMPORTS OF COTTON TO THE PORT OF MANCHESTER

(AMERICAN AND EGYPTIAN)

	American (thousand bales) ¹	Egyptian (thousand bales)	Total (thousand bales)
1894-1895	32	33	65
1895-1896	121	68	189
1896-1897	212	88	300
1897-1898	246	99	345
1898-1899	311	85	396
1899-1900	415	137	552
1900-1901	443	107	550
1901-1902	421	126	547

¹ A bale weighs about 500 lbs.

The question of the supply of cotton is agitating Lancashire and the Continent at the present time, owing largely to recent shortages of the crop, and a British Cotton Growing Association has been formed. A similar movement took place half a century ago, which resulted in the establishment of the Cotton Supply Association. This Association was instituted in April, 1857, that is some time before war broke out in the United States, or conflict had become imminent. It originated, according to the fifth annual report, "in the prospective fears of a portion of the trade that some dire calamity must inevitably, sooner or later, overtake the cotton manufacture of Lancashire, whose vast superstructure had so long rested upon the treacherous foundation of restricted slave labour as the main source of supply for its raw material."¹

Between 1840 and 1860 the American cotton crop increased about 100 per cent., while English and European spindles increased by about 150 per cent., and many began to feel that, apart from the question of slave-labour, the dependence on America was too exclusive, and that unless active steps were taken the supply of raw cotton might prove inadequate to meet the needs for it. The methods of the Association were stated thus:—

"To afford information to every country capable of producing cotton, both by the diffusion of printed directions for its cultivation, and sending competent teachers of cotton planting and cleaning, and by direct communication with Christian missionaries, whose aid and co-operation it solicits; to supply, gratuitously in the

¹ The Association published a weekly paper known as *The Cotton Supply Reporter*

first instance, the best seeds to natives in every part of the world who are willing to receive them, to give prizes for the extended cultivation of cotton, and to lend gins and improved machines for cleaning and preparing cotton."

A marked extension of the cotton supplies of India followed upon the early activities of the Cotton Supply Association, but probably the cotton famine in Lancashire, and high prices caused by the American Civil War, did as much at least to bring this about as the Association, though it appears to have acted with considerable energy.¹ The English Government had been stirred up prior to the establishment of the Cotton Supply Association to assist in introducing the cultivation of cotton to fresh districts, but according to a Mr. Clegg, who afterwards interested himself keenly in the work of the Association, none of the gins for cleaning which had been presented by the British Government to various places were found working or workable in any of the spots visited by him in 1855 in the course of a tour through the Eastern countries bordering on the Mediterranean.

Without the active intervention of a strong body of interested parties it is sometimes unlikely that new industries will be undertaken even in places well suited for them. The reliance upon high prices to call forth enterprise through the operation of self-interest is not always well placed, and trust in the principle of *laissez faire*, if that phrase be taken to advise leaving ignorance and apathy to surmount the obstacles which prevent the

¹ Many publications of the Cotton Supply Association will be found in the Manchester public library. The volume marked "677. I. CII." contains a good collection

foundation of industries, rather than placing no unnecessary obstacles in the way of industrial enterprise, may easily block many desirable lines of economic advance. Want of information, want of trust in information, want of initiative and capital, the domination of custom, distrust and fearfulness at the thought of change in such countries as India and West Africa, may indefinitely postpone the appearance of crops for which the land is suited, and of which other countries are in need. It is no departure from the best traditions of Manchester economic politics that to-day Lancashire is exerting herself to bring about the growth of cotton in such new places as offer suitable conditions. Nevertheless there are peculiar risks connected with associated efforts in undertakings such as the one that we are considering. The initial force of such a movement is almost invariably greater—perhaps much greater—than its average power will be in succeeding years. There is therefore a danger that plans will be laid down on a magnitude quite out of proportion to the capacity of the Association in the future. These dangers are of less moment where the work of the Association is to start enterprises which will continue to develop afterwards of their own vigour without assistance or encouragement; on the other hand, they are grave when the cause that gave rise to the initial enthusiasm is likely to be removed soon. The British Cotton Growing Association will suffer a severe strain if the price of cotton remains low while a large proportion of the enterprises started by it continues to require watching and pushing.

The British Cotton Growing Association was formed on June 12th, 1902, and has since received a Royal Charter. As it contemplates work on a large scale, it

is trying to get its share capital up to half a million. Reference was made to it thus in the King's Speech on February 2nd, 1904.—

“The insufficiency of the supply of the raw material upon which the great cotton industry of this country depends has inspired me with deep concern. I trust that the efforts which are being made in various parts of my empire to increase the area under cultivation may be attended with a large measure of success.”

Machinery and financial assistance are being given by the Association where it is needed, and in addition some assurances have been made as to sales and prices. In some cases large tracts of land have been purchased for the growth of cotton by the Association, and in other cases model farms have been started ; ginning and buying centres have been widely established, and numerous experts have been engaged to distribute seed and give instruction. India, the West Indies, British Guiana, East Africa, West Africa, Australia, Africa—all have received some attention. The Government is lending its countenance and co-operating to some extent with the Association some financial assistance is being given by the Governments of Southern Nigeria, Sierra Leone, and Lagos, and questions of transport no doubt will be dealt with as far as possible to meet the needs of the industry of cotton-growing wherever it may be established.

Favourable reports as to the possibilities of extending the area of cotton cultivation have been made by Professor Dunstan on a reference from the Government, and high hopes are entertained by many in Lancashire in consequence that more will be accomplished by the

new body than was effected by the old Cotton Supply Association.¹

The desirability of spreading more widely the work of cotton-growing is felt on the Continent as well as in England, and in other countries than England steps are being taken to bring it about. Interesting papers on the subject were read at the first International Congress of representatives of Master Cotton Spinners' and Manufacturers' Associations at Zurich in May, 1904, when it was resolved—

“That this International Congress of Master Cotton Spinners and Manufacturers, having appointed a Committee for the purpose of taking steps for safeguarding the interests of the industry, and recognising the enormous tax the recent enhancement of prices has imposed upon all users of cotton, requests this Committee to bring before the Associations here represented, the allied trades, the general public, and the Governments of the various European countries the absolute necessity of increasing the supply of raw cotton, to enlist their sympathy and practical support in favour of all efforts to grow cotton wherever it can be cultivated with a prospect of success, as in the opinion of this Congress a great increase is essential to the preservation of the cotton industry, on which the public welfare of all European countries so largely depends.”

The Congress also placed on record “its cordial appreciation of the efforts of those Governments and

¹ An account of the Cotton Growing Association will be found in two papers by Mr. Hutton, one read to the Manchester Statistical Society in 1904, and the other contributed to Section F of the British Association in the same year. In addition to his official memorandum, Professor Dunstan has also written upon the prospects of cotton-growing within the empire in a paper supplied as a supplement to Mr. Hutton's paper to the British Association referred to above.

Institutions which have already supported cotton-growing in their respective colonies." It may be of interest to notice briefly here what is being done to extend the growth of cotton by the other European countries which next to England are most affected by variations in the price and supply of cotton. A German Colonial Agricultural Committee was established in 1896, and in 1900 this Committee began to give special consideration to the question of cotton-growing. In that year a cotton mission was sent to Togo, and since then cotton-growing experiments in German East Africa and other German colonies have been extended. The scale of work being undertaken by the Germans, however, is far less than that of the British Cotton Growing Association. The same statement may be made with regard to France. The Association Cotonnière Coloniale took its origin from the French Cotton Employers' Federation. Founded in 1902, with a membership of less than 700 and an assured income of no more than £4,000 a year, which is guaranteed only for six years, it failed from the first to attract much attention, and has been unable to accomplish or even attempt very much.

A number of advantages are expected to result from the raising of cotton in appreciable quantities from new districts.

I. In the first place the supply would be rendered more elastic, as Professor Alfred Marshall pointed out in the discussion upon cotton-growing within the empire at the meeting of the British Association at Cambridge in 1904. With cotton growing in numerous places and in proximity to other crops, its supply could be more rapidly increased than if its cultivation were confined to very extensive areas devoted entirely to cotton, since,

were there need, much other cultivated land in the vicinity of cotton fields could be used for raising cotton. The specialised district, like all specialism, has its advantages, but it is possible to combine these with conditions that heighten elasticity in supply

II. Desirable variations in the raw material might possibly eventuate from its growth in new climes. A new quality of cotton, as well as a new stock at a suitable price, resulted from the introduction of cotton into Egypt

III. Lastly, there is the effect on the places themselves to which the new industry of cotton-growing is carried. This must be good—provided that the new industry is not worked entirely without regard to the interests of the native labourers engaging in it—for a wider sphere of activities will be opened to the inhabitants of those places, and their well-being will be rendered more secure in being supported by an additional branch of trade.

CHAPTER II

EARLY HISTORY OF THE INDUSTRY AND TECHNICAL ADVANCE

IT is impossible to say where the cotton manufacture appeared first, but it certainly flourished in India in remote ages. Herodotus writes of the Indians —¹

“They possess likewise a kind of plant, which, instead of fruit, produces wool, of a finer and better quality than that of sheep: of this the Indians make their clothes.”

It is obvious from this reference, and from other references to the clothing of the Indians, that cottons were not at the time worn in Europe it would appear, indeed, that they did not come into extensive use until centuries after. It is interesting to notice that many of the inhabitants of the New World, on its discovery, were found clothed in apparel made of cotton.

The cotton manufacture of Europe first assumed prominence in Spain, where the raw material also was raised.² By the middle of the thirteenth century the Spanish cotton manufacture had become a flourishing branch of industry. It would be tedious, and unnecessary for the purposes of this book, to trace the spread of the cotton industry in Europe, and its

¹ Quoted from Baines' *History of the Cotton Manufacture*

² For some account of the Spanish cotton industry see chapter v.

numerous vicissitudes. The work was attempted by the younger Baines, the historian of the cotton industry; and it will be sufficient here to quote the brief summary of his conclusions

“It is obvious that the use of cotton clothing spread very slowly, except when it was borne onward by the impetuous tide of Mohammedan conquest and colonisation. The manufacture was general in India, and had attained high excellence, in the age of the great Greek historian; that is, in the fifth century before Christ, at which time it had already existed for an unknown period; yet eighteen centuries more elapsed before it was introduced into Italy or Constantinople, or even secured a footing in the neighbouring empire of China. Though so well suited to hot climates, cottons were known rather as a curiosity than as a common article of dress in Egypt and Persia, in the first century of the Christian era, five centuries after the Greeks had heard of the wool-bearing trees of India; in Egypt the manufacture has never reached any considerable degree of excellence, and the muslins worn by the higher classes have always been imported from India. In Spain the manufacture, after flourishing to some degree, became nearly extinct. In Italy, Germany, and Flanders it had a lingering and ignoble existence. It would be altogether a mistake to suppose that the same manufacture ever existed in any other part of Europe which now exists in England. A coarse and heavy article was, indeed, fabricated, probably half of cotton and half of linen, but it was of too little importance to attract the notice of historians; and calicoes, muslins, and the more delicate cotton goods were never made in Europe, except possibly by the Moors in the south of Spain, until the invention of the spinning machinery in England.”

That an article which is regarded to-day almost as a necessity of existence should have won its way so slowly into common use is at first surprising. But cottons cannot be manufactured with ease in all places ; moreover, in the economic dark ages industries were dependent for their material almost entirely upon local sources of supply, and cotton cannot be cultivated with any success in many places in Europe. The lines of commerce in those days were few and the stream of commerce was thin. From India goods were carried by a lengthy overland route to the Mediterranean, and thence by sea to the emporium at Venice, whence they were distributed, either overland again and by the Rhine route to Northern Europe, or by the Venetian fleet to the cities on the coast. Even after the discovery of the Cape route, trade with India was toilsome, slow, and costly. Under such conditions it was unlikely that Indian goods should be extensively demanded. And in Europe itself traffic was too arduous, except between a few specially favoured places, for much commercial enterprise to be shown. The goods from one district could not be spread easily over wide areas. In general the economic self-sufficiency of districts is characteristic of the middle ages, and even of the years immediately succeeding the Renaissance. The large localised exporting industry was impossible, and equally impossible was the scattering of an industry dependent upon localised supplies of material. Moreover, it was not until comparatively recent times that the difficulties attending the production of textiles from fibres with so short a staple as cotton were adequately overcome by improvements in the process of manufacture.

It has been suggested that the cotton industry was

started in this country by refugees from the Netherlands after the persecutions by the Spaniards in the second half of the sixteenth century, but no direct proof has been forthcoming. The woollen industry was carried on in Lancashire prior to the establishment of the cotton industry there; when the cotton industry was introduced, therefore, it naturally developed rapidly, since it was grafted on to the organisation of a textile industry which was already well developed. As early as the middle of the seventeenth century, the cotton trade was referred to as one of the most important industries in Manchester, and one may read later, in the writings of De Foe and historians of Lancashire, of the transference of the woollen industry from Lancashire to the West Riding.

A complete account of the industry in its earliest forms cannot be attempted in this chapter,¹ but a few words must be said as to the state of organisation prior to the establishment of the factory system. The central functionary in the primitive industrial system was the Manchester merchant. He bought the fabric from the weavers, many of whom worked on their own account, and sometimes provided them with cotton-wool and warps, the latter of which were made chiefly of linen, and procured largely from Germany and Ireland. The cotton-wool was cleaned, carded, and spun by women and children. In numerous instances a weaving family would work a small agricultural allotment in addition to engaging in the cotton industry, or assist, particularly at harvest time, at farm work in the district. The Manchester merchants, who at first

¹ A full account will be found in the author's *Lancashire Cotton Industry*.

were merely traders, though they frequently financed the weavers by giving credit for warps and cotton-wool, put out the grey cloth to be dyed and finished, and afterward disposed of it in a variety of ways. Large quantities were sent to the fairs, which were held then in Newcastle, Chester, and other places. Goods were at first carried by pack-horses, but after the improvement in roads waggon superseded them. The market was extended by "riders out," who scoured the country with patterns.

The system described above slowly dissolved. The Manchester merchants became, in a higher degree, undertakers who employed the weavers on warps and cotton-wool or yarn supplied to them. When it became usual for the weaver to be provided with warps ready for the loom, "fustian masters" appeared in the various country districts in which the weavers resided. The fustian masters dealt with the Manchester merchants on the one hand, and the weavers on the other hand, but frequently they were merely agents for Manchester houses.

The part of the industry which fell first under the factory system was warping, but it was not a factory system of any magnitude. In earliest times the weaver himself had prepared his warp for the loom, but it no longer paid him to do so after the invention of the warping mill, the economies involved in the use of which were considerable. The weaver producing in a small way could not afford a warping mill, and the use of the warping mill was not economical unless it could be kept working for a longer time each month, say, than one weaver or a few weavers would require it. The adoption of the factory system generally throughout the cotton industry

was necessitated by the mechanical inventions associated with the names of the Kays, Hargreaves, Paul, Arkwright, Crompton, and Cartwright, but the shed in which many hand-loom weavers were engaged upon an employer's looms was not unknown prior to the introduction of weaving by power.

Before the technical development of the cotton industry in the British Isles is dealt with, a few words must be said of the processes of manufacture. The fundamental processes are cleaning, carding, drawing and roving, spinning, and lastly weaving, which is usually termed manufacturing. Of bleaching, dyeing, printing, and finishing we shall not treat in this volume. In carding, the fibres are raked parallel, in drawing and roving, the long, loose, thick ropes of cotton fibres laid parallel are drawn out finer and given a slight twist with the object of increasing the cohesion of the threads. Spinning refers to the final stage in the production of yarns, which are weft yarns and loosely twisted, or hard-twisted yarns used chiefly for warps. The process of weaving is so well known as not to require description.

In spinning, two fundamental inventions have appeared, namely, Hargreaves' "jenny," which was completed about 1764, and the system of spinning by rollers. The principle of the former consisted merely in the multiplication of the human grip by means of clamps, so that spinning from many spindles could be performed by one person. On the other hand the essential feature of the water-frame was the substitution, with regard to the drawing out of the threads, of a mechanical method for the human arm. The mechanical method consisted in rollers revolving at different velocities. The system was invented by Lewis Paul in

1738, with the assistance of a mechanic named Wyatt, but it was Arkwright who, by repairing defects and adding a number of small improvements, placed the economies of the method beyond dispute. Arkwright took out his first patent in 1769. Twist was given to the yarn by the use of a flyer in the water-frame, and by the revolution of the spindles in the case of the jenny. The water-frame was so termed because water-power was employed to drive it almost from the first. In Crompton's mule, introduced about 1780, the system of rollers and the dragging arrangements of the jenny were combined. Hence the term "mule"—

"The force of nature could no further go,
To make a third, she joined the former two"

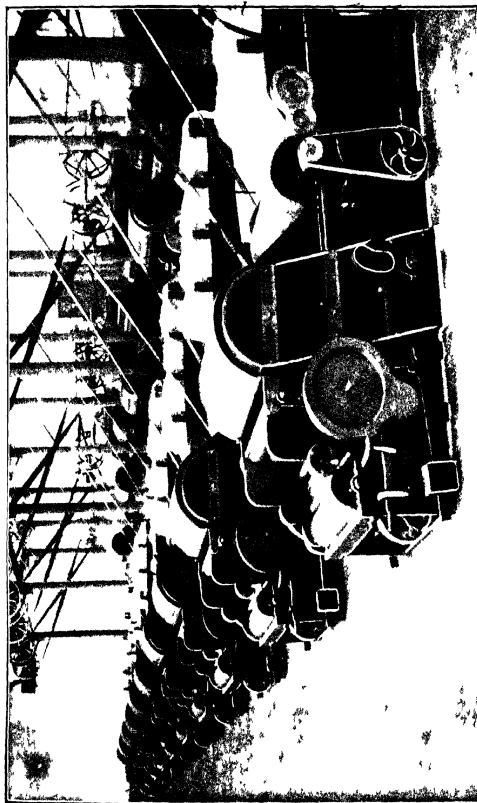
The effect of Arkwright's invention was to bring about the substitution of cotton warps for linen or woollen warps. Prior to the introduction of spinning by rollers, all warps for cotton textiles, except Eastern fabrics, had been made from linen or wool, because no machinery was capable of spinning a thread strong enough to stand the tension to which warps are subjected. The staples of wool and linen are much longer than those of cotton, and the longer the staple, other things being equal, the firmer can the thread be spun.

Arkwright was an ingenious and practical man, endowed with good business judgment, and remarkable energy and perseverance, his rare combination of gifts brought him wealth. Hargreaves was less fortunate than Sir Richard Arkwright. From his invention he gained little. On the ground that he had built and sold jennies before applying for a patent, protection was refused him, and he was compelled to leave Lancashire because of

the hostility of the workpeople, who thought their interests were affected detrimentally by his machines Crompton received a grant from Parliament, and on the whole was placed in easy circumstances.

Crompton's mule was chiefly of value because it produced a very fine thread. The threads, after being stretched on this machine to a certain degree of tenuity by the rollers, were drawn out finer by means of Hargreaves' device of the clamp. At first the mule could be worked only by a highly dexterous person, finally, however, an efficient self-actor mule was invented by Roberts, of the firm of Sharp, Roberts, and Company, of Manchester. For a long time, nevertheless, the hand-mule held its own, partly because of the imperfections of the self-actor, particularly in respect of winding arrangements, and partly because upon fine yarns the self-actor could not work faster than the hand-mule. The favourite system for many years was that of the carriage being driven out by power but put back by hand, while the winding was directed by hand. The carriage by receding from the rollers effected the drawing of the yarn after it had left the last pair of rollers.

In spinning there is one other important invention to notice, namely, the ring-frame, which appeared about the middle of the nineteenth century. Some experts are of opinion that in the future a much larger proportion of cotton yarn will be produced on the ring-frame, but at present it is incapable of spinning the "oozy" yarn which is required for the web of certain fabrics. On the water-frame the twist was given by a flyer. The yarn on leaving the rollers passed through a ring at the end of an arm which revolved round the bobbin upon which the yarn was being wound. The movement of the bobbin



was caused by the tension on the yarn. On the ring-frame the flyer is a small metal ring moving easily round the collar of an orifice through which the bobbin rises and falls to receive the yarn to be wound upon it. The tension on the yarn, which tends to be wound faster than it is given out, sets the ring revolving, and the ratio of the motion of the ring to the rate of wrapping determines the amount of twist put into the thread. Throstle-spinning and spinning on the ring-frame are thus identical in general principle, the sole difference being that in one case motion is given directly to the flyer and indirectly to the bobbin, whereas in the other case it is given directly to the bobbin and indirectly to the ring which serves as flyer. Ring-frames have increased rapidly during the last twenty or thirty years, but the proportion of ring-frames to mules is much greater in America than here.

Hargreaves, the inventor of the jenny, also invented the cylinder carder. This consisted of a bristled trough with a bristled roller working within it. The cotton fibres were brushed parallel as they passed between the trough and roller. Another system, which need not be described here, succeeded, but this system is now almost entirely superseded by revolving flat-cards. In the revolving flat-cards the cotton is brushed between a revolving cylinder and a flexible endless brush working on the top of it.

The great mechanical advance in the textile industries, which contributed so materially to the industrial revolution, began with the invention of the fly-shuttle. It is remarkable that for this invention the world waited so long. In view of the early use of textiles, one would have expected *a priori* as early an appearance of the fly-

shuttle as of the device of the wheel; yet it is a fact that until nearly the middle of the eighteenth century the method of weaving remained almost the same as it had been in remote ages. Originally the shuttle was cast by hand between the threads of the warp. The warps were moved up and down alternately in groups, so that the weft might pass now under and now over any particular thread or threads. In this way a web was produced. Kay's idea was to set the shuttle in motion by means of hammers fixed at the ends of the grooved plane which supported the shuttle. To the hammers motion was given by the jerking of a stick known as the "picking-peg," which was connected with the hammers by threads.

A less important, but nevertheless valuable, invention was that of the drop-box made by John Kay's son Robert. This enabled goods with coloured wefts to be produced. It was a partitioned lift which could be lowered or raised in order to bring any partition into line with the grooved plane. Shuttles loaded with different-coloured wefts were placed in the partitions. Closely analogous to the "drop-box" was the "draw-boy," which had been invented years before. This was a device for altering the arrangement of the warps crossed by the weft, so that figured goods might be produced. Ultimately it gave place to the Jacquard loom, in which the work is done altogether automatically, much as a tune is picked out mechanically on a hand-organ or street-piano.

The fly-shuttle, which so greatly increased each weaver's productiveness that the supplies of cotton yarn spun on the old single-spindle wheel proved insufficient to meet the weavers' needs, was followed by the invention of Hargreaves' jenny with its row of spindles, all of

which could be kept spinning at once by a single person. Jennies rapidly lengthened, the mule appeared, and the power of horses, water and steam was applied to spinning. Soon there was a tendency for supplies of yarn to outrun the demands of weavers · it was with the object of remedying this state of affairs that Cartwright first thought of power-weaving. Edmund Cartwright was a clergyman (the brother of Major Cartwright, a well-known Radical of the beginning of the century) and it was in consequence of conversations with some Manchester manufacturers during a stay at Matlock that he was induced to bend his mind to the solution of a practical difficulty in an industry of which he had no knowledge and with which he had no connection. Success ultimately crowned his efforts, but only after long trial. Though the power-loom was to prove of immense service, for years its performances were not such as to render its use economical. Many, including Cartwright himself, lost heavily in trying to introduce the new machines. Cartwright's comparative impoverishment was relieved by a grant from the Government of £10,000, which was voted to him as compensation for his losses and in recognition of the value of his invention to the nation. The first power-looms had to be stopped at frequent intervals for the warps to be sized. moreover, they contained no contrivance for taking up the cloth continuously as it was woven. These defects, which materially lessened the value of power-looms, were repaired, however, by the devices invented by William Radcliffe, of Stockport, with the assistance of a mechanic named Johnson.

Cartwright had thought out a system whereby the loom could be stopped automatically on the snapping of

a warp, but it was not until recently that warp-stop motions were extensively applied. For a long time, however, the looms in general use have been so contrived as to be thrown out of action on the snapping of the weft, and in the last few years workable arrangements for the self-feeding of looms, whereby weaving is rendered much more continuous, have been put forward. Another invention of recent date prevents the cloth woven on automatic looms from being defaced by half-picks: a new supply of weft comes into operation before the old cop has been completely exhausted. Automatic looms are employed to a far greater extent in the United States than elsewhere: it is said that they are more serviceable for the kind of cloth produced in largest bulk there than for the qualities upon which the English trade chiefly depends. The following descriptions of the Northrop loom and other looms, from the pen of Mr. T. M. Young, who has recently examined the state of the cotton industry in America, will afford the reader some idea of their nature.

“The essential difference between it (the Northrop) and a common, or any other automatic loom, is, that when the weft breaks or is exhausted the shuttle is automatically recharged with weft and threaded without being itself removed from the sley. There is a cylindrical battery or magazine, like the magazine of a revolver, over the shuttle-box at the side of the loom, and this magazine can be filled with ‘cartridges,’ either bobbins of ring weft or cops of mule weft. Ring weft for the Northrop loom is spun on specially made bobbins, which are simply laid into the magazines, cops have to be skewered upon a steel spindle, with a wooden head similar to that of the ring bobbin. When the weft-

changing mechanism is brought into play by the action of the weft-fork, a bobbin, or a cop on its skewer, is forced from the magazine into the shuttle, which is always then at the end of the sley immediately beneath the magazine, the spent bobbin, or skewered cop, is forced out through the shuttle and the bottom of the sley, and with the first impulse of the picking-stick the shuttle threads itself and the weaving continues without interruption. All that the weaver has to do, then, in regard to the weft, is to keep the magazines charged with weft, and as there is always a contrivance on these looms which stops them when a warp thread breaks, the weaver has no need to watch the warps, when he sees a loom standing he goes and finds the broken end and ties it up and starts the loom again—that is all. The weft magazine may contain as many as thirty charges, enough to keep the loom running for a couple of hours . . . The Harriman looms resemble the Crossley and other English automatic looms more closely than the Northrop loom. In the Harriman loom a continuous supply of weft is maintained by changing the shuttle, and not, as in the Northrop, merely the bobbin or cop in the shuttle. But whereas in the Crossley loom this change is accomplished while the loom is running at full speed, in the Harriman loom the weaving is temporarily suspended, and some little time is taken for the change.¹ Unlike the Northrop mechanism, which, in America at any rate, is only procurable in the form of a complete loom, the Harriman mechanism can be applied at a comparatively small cost to existing looms, whether of the 'over-pick' style, as used in Lancashire, or the 'under-pick,' as used everywhere in America. The mechanism of the Hattersley loom

¹ In one pattern of the Harriman loom the shuttle is changed while the loom is running.

resembles that of the Harriman loom more closely than any of the other English looms which I have seen. The makers of the Harriman loom have associated with it an automatic pickfinder for twills and drills, also an electro-mechanical warp stop-motion, which consists of two rows of drop-wires and an insulated vibrator placed below and between them, which stops . . . the loom when a drop-wire falls; a temple of special design, and a hand-threading shuttle, which removes the necessity for sucking the thread through the shuttle eye—a notoriously unhealthy practice.”

The Northrop is only one of many automatic looms which are now before the public, or on the point of being offered to the public. Another cop-changing loom which is fairly well known is the Crossley No. 2; this, like the Northrop, provides also for continuous weaving by the ejection of the exhausted spool when the loom is running at full speed. Of shuttle-changing looms there are many; in some the shuttle is automatically changed during a momentary stoppage of the machinery, in others the substitution of the new shuttle takes place without the action of the loom being checked. One of the Harriman designs and the Hattersley loom are of the former type; the Crossley No. 1, the Baker-Kip, the Ross, the Cowburn, the Walker, the Gregson and Monk, the Harling and Todd, the Manchester Automatic, and others are of the second type.

Automatic looms are not much used in this country at present. It is said that their economies are not great enough, in the case of many of our leading products, to cause their speedy introduction. However, the future will undoubtedly see their efficiency greatly augmented.

Unquestionably automatic machinery will play a larger part in the future in the Lancashire cotton industry, as well as in other industries, into many of which it is already making its way. We ought, therefore, to consider what its effect will be upon the conditions of the operatives, for their interest is the major interest to be taken into account.

First, in approaching this question, it will be of interest to notice that wages were rising when the automatic looms were displacing the old looms in the United States. The fall in price consequent upon the economies of the new appliances was such that the enlarged demand for cotton fabrics elicited actually proved sufficient to prevent any displacement of labour, and, since the value of efficient labour was heightened, capable hands were enabled to earn much higher wages than ever before. It does not follow, of course, that American experience will be repeated in England. Were the change from the present system to take place very rapidly, a severe shock might be felt by the labour of Lancashire. Suddenness of change, however, is extremely unlikely, and further, there appears to be little fear of the automatic looms causing a rapid revolution. Past experience and present movements both justify this view. The old industrial revolution in Lancashire took place so slowly that it is questionable whether the hand-loom weavers of Lancashire need have suffered much had they not attempted to work their hand-machines in competition with the factories. A part of the tendency for the automatic machines to displace labour will be counter-acted by the need of an increased output at the lower cost of production reached. In the long run the

employment of fewer cotton-weavers than would have been engaged otherwise may result, but this end may be attained without the number of weavers in the cotton industry suddenly diminishing. The growth of population extensifies demand, and any contraction of the body of weavers might take place at a rate which would be met merely by a check on those entering the industry. Further, an increased demand for labour will be experienced in all branches of the cotton industry which prepare material for the process of weaving. We must notice, in addition, that automatic machines involve less tedious labour on the part of their "tenters" than the old-fashioned looms, and call for a higher degree of trained intelligence in those controlling them. It is good that the quantity of purely mechanical work to be done by human beings should be diminished, and certainly the life of a cotton weaver, who must be something of an engineer and understand the complicated machines around him, the working of which he directs, should be more interesting than it was when appliances were more primitive. The demand for trained intelligence will evoke it and create the conditions under which it will be forthcoming in the large quantities in which it will be required. We may therefore look forward with some confidence to higher wages in Lancashire and better conditions of factory life generally, for with more education comes an insistence on refinements in surroundings. Even in the short periods of abnormal changes that must be passed through there would seem to be small fear of any unusual distress being felt.

Turning, in conclusion, to the point of view of consumers, we need but mention how greatly all classes will benefit from cotton textiles being cheap.

Another important modern idea of interest relating

to mechanisms for weaving is that of removing the shuttle and replacing it with a weft-carrier, which keeps drawing from a supply of weft sufficient quantities for two picks. It is difficult to give an idea of weft-carriers without the aid of diagrams. An illustrated article on the subject appeared in the *Textile Manufacturer* for March 15th, 1899, and to this article those who would understand the system of weft-carrying in detail must be referred. So far weft-carriers have been judged unsuitable for the cotton industry.

It will be of interest, nevertheless, to consider the fundamental ideas worked out in them, for improvements must be looked for, and there is no foretelling whether or not weft-carriers or some development from them may not prove economical for the Lancashire industry in the future. Further, we gain from examining novel ideas, because they guard us against thinking of any particular process as the only one possible for achieving a given end. The weft-carrier, which passes to and fro between the warps, is oblong in shape and fitted with jaws at each end. The jaws grip a piece of weft at the right of the loom, say, and drag it through the warps. On its return journey the carrier brings a piece of weft from the left. Having returned again to the right, the weft-carrier seizes in its jaws the other end of the piece of weft, one length of which had previously been inserted, and drags it in turn through the warps. The weft is therefore inserted in detachable pieces, each of which constitutes two threads of the woof. The ends are worked up into a regular selvage. At first sight the advantages of weft-carriers will not seem considerable; the system of which they are the essential parts strikes one as unnecessarily complicated.

However, for certain fabrics they are said to have a promising future. With weft-carriers in use warps need not be separated so widely, since the carriage of a considerable supply of weft between them on every laying of the weft is avoided. Again, the weaving may be almost perfectly continuous, since unlimited supplies of weft can be attached at once to the appliances which present yarn to the carrier and shear it off in suitable lengths. There are said, moreover, to be additional conveniences in the case of the fabrics produced with many-coloured wefts.

Another plan for avoiding the defects of the ordinary loom is that of weaving several pieces together in the form of a cylinder, so that the shuttle may fly round in circles continuously. This device is being tried experimentally.

The following tables will afford a rough idea of the economies resulting from the development of spinning and weaving in the last century. The tables, except the last columns, were constructed by Mr Ellison: they were brought up to date by Mr. Merttens, in his paper on "The Hours and Cost of Labour in the Cotton Industry at Home and Abroad," read to the Manchester Statistical Society in the session 1893-4. Mr. Merttens pointed out that the figures for 1891-3 would have been more favourable but for the Oldham "lock-out," which is said to have curtailed the consumption of cotton by nearly half a million bales. In interpreting these tables, especially the more recent figures relating to the output per operative and the labour cost per pound weight, the reader must bear in mind that yarns and fabrics have become much finer on the whole.¹

¹ The method of describing degrees of fineness is explained in a note on page 157.

EARLY HISTORY

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SPINNING MILLS

Years.	Spindles (000s omitted)	Operatives in Cotton Mills	Operatives per 1,000 Spindles	Hours per Week.	Average Wages per Week	Production			Yarn Spun (000s omitted)	Labour Cost per lb	Yarn Exported (000s omitted)
						Per Spindle per Year	Per Operative Per Year	Per Hour			
1829-31	10,000	140,000	14 0	69 ¹	s 10 6 d	lbs 21 6	lbs 1,546	lbs 431	lbs 216,500	d 4 2	lbs 63,300
1844-46 ¹	19,500	190,000	9 74	60 ¹	11 0	26 8	2,754	883	523,300	2 3	145,190
1859-61	30,400	248,000	8 16	60	12 6	30 0	3,671	1 176	910,000	2 1	189,130
1880-82	42,000	240,000	5 71	56 ¹	17 0	31 5	5,520	1 879	1,324,900	1 9	236,360
1891-93	45,270	220,000	4 86	56 ¹	19 0	32 4	6,662	2 276	1,465,600	1 6	228,362

¹ Undoubtedly understatements.

WEAVING MILLS

Years.	Looms.	Operatives in Weaving Mills	Hours per Week	Average Wages per Week	Production			Goods Produced (ooo's omitted)	Labour Cost per lb	Goods Exported (ooo's omitted)
					Per Loom per Year	Per Operative Per Year	Per Hour			
1829-31	{ Power : 80,000 { Hand : 225,000	{ 50,000 { 225,000	69 ¹	{ s d { 9 6 { 7 0	lbs 470	lbs 521	lbs 145	lbs 143,200	d 9 00	lbs 82,600
1844-46	{ Power : 225,000 { Hand : 60,000	{ 150,000 { 60,000	60 ¹	{ 10 0 { 8 0	1,234	1,681	539	348,110	3 500	228,500
1859-61	400,000	203,000	60	11 10	1,627	3,206	1 027	650,870	2 90	536,000
1880-82	550,000	246,000	56½	15 0	1,806	4,037	1 374	993,540	2 30	888,000
1891-93	660,000	310,000	56½	16 6	1,866	3,972	1 352	1,231,300	2 59	903,640

¹ Undoubtedly understatements.

CHAPTER III

COMMERCIAL AND INDUSTRIAL ORGANISATION

IT would be impossible in the short space at my disposal in this work to attempt a detailed analysis of the organisation of the cotton industry and trade even under present conditions only. A much fuller account will be found in my work on the *Lancashire Cotton Industry*, together with an examination of the influences under which the development of organisation has taken place. Here I must be content to offer only a brief sketch, which will be designed chiefly to show commercial and industrial organisation in their mutual relationships.

The industrial organisation of the Lancashire cotton industry is closely associated with its localisation, which is intense. Some 76 per cent. of the cotton operatives of the United Kingdom work in Lancashire, and nearly 90 per cent. are to be found in a small area which includes parts of Lancashire, Cheshire, Derbyshire, and the West Riding. The humid atmosphere of Lancashire, its harbour and its coal, explain largely the attraction of the cotton industry to Lancashire.

Considerable changes have taken place in the organisation of the cotton industry. At first the whole industry was carried on under the domestic system. In

the next period spinning removed to factories, while weaving, on the whole, still remained in the cottage. The explanation was the technical advance made in spinning: the invention of the jenny created small factories, and the invention of the water-frame caused large factories to be built on watercourses. Spinning became an industry distinct from manufacturing, owing partly to the fact that it was economical to apply other than human power to drive the new machines. In the next stage, after the invention of the power-loom, spinning and weaving reunited. The people who could experiment most economically with the power-loom were those who already possessed factories fitted with power, hence the first sheds for power-weaving were joined as a rule to the existing spinning factories. Later, the differentiating influence appeared again, and to-day the spinning-mills having no weaving-sheds attached to them constitute a large proportion of the total. Moreover, in the second half of the nineteenth century a decentralising movement was generated. Coarse spinning withdrew to Oldham, and fine spinning to Bolton, for example. In manufacturing, as well as in spinning, the specialisation of districts became noticeable. The causes of this second order of localisation, so to speak, must be analysed; but before the analysis is entered upon, it will be desirable to give some account of the present state of district specialisation. I cannot do better, therefore, than quote an instructive passage from a lecture by Elijah Helm, the late secretary of the Manchester Chamber of Commerce:—

“The cotton industry of the United Kingdom is much more highly differentiated than that of any other country. Not only is the variety of the productions

much greater, but also the several branches of the industry are specialised to a degree not known elsewhere. In the first place the two operations of spinning and weaving are, in the main, separated, being conducted to a large extent in different districts. Thus spinning is largely concentrated in South Lancashire and in the adjoining borderland of North Cheshire. But even within this area there is further allocation. The finer and the very finest yarns are spun in the neighbourhood of Bolton, and in or near Manchester, much of this being used for the manufacture of sewing-thread, whilst other descriptions, employed almost entirely for weaving, are produced in Oldham and other towns. The weaving branches of the industry are chiefly conducted in the northern half of Lancashire—most of it in such large boroughs as Blackburn, Burnley, and Preston. Here, again, there is a differentiation. Preston and Chorley produce the finer and lighter fabrics, Blackburn, Darwen, and Accrington, shirtings, dhooties, and other goods, extensively shipped to India, whilst Nelson and Colne make cloths woven from dyed yarn, and Bolton is distinguished for fine quiltings and fancy cotton dress goods. These demarcations are not absolutely observed, but they are sufficiently clear to give to each town in the area covered by the cotton industry a distinctive place in its general organisation. In the processes following that of weaving, to which the fabric is submitted, except when it is exported in the 'grey' state, there is also much further separation in processes. These are chiefly calico-printing, bleaching, dyeing, mercerising, and finishing. But the most remarkable separation of functions in the cotton goods trade is the almost complete distinction between the businesses of manufacturing and distributing."¹

¹ Printed in *British Industries*. Edited by Professor W. J. Ashley.

To the last point raised in the above passage we shall recur later. here it will be sufficient to note that distribution is almost entirely in the hands of home trading houses, which stand midway between retailers and manufacturers, and arrange for the printing and finishing of such cloth as may have been bought, as is usual, in the "grey," and houses dealing chiefly with foreign parts, known as "shipping houses," the business of which is otherwise the same as that of the home traders. Both the home traders and foreign traders have their chief offices in Manchester.¹ We might note further in this place that a good deal of the business in the yarn and cloth markets is done through other intermediaries known as yarn agents and cloth agents.

A detailed idea of the location of the British cotton industry at the end of the nineteenth century can be gained from the statistics as to the distribution of spindles, looms, and workers, which are given below.

ESTIMATES OF SPINDLES IN ENGLAND IN THOUSANDS

(Names of places in this table stand for towns together with their surrounding districts) No of Spindles in thousands

Oldham .	11,603
Bolton .	5,035
Manchester and Salford .	2,666
Rochdale .	2,168
Preston .	2,036
Ashton-under-Lyne .	1,839
Stockport .	1,803
Leigh .	1,667

¹ The interesting paper on "The Middleman in Commerce," by Elijah Helm, will be found in the *Transactions of the Manchester Statistical Society*, 1900-1.

ORGANISATION

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	No. of Spindles in thousands ¹
Mossley	1,375
Blackburn	1,325
Stalybridge	1,106
Glossop	968
Heywood	869
Bury	818
Wigan	802
Farnworth	738
Dukinfield	687
Burnley	687
Chorley	547
Hyde	553
Middleton	511
Accrington	417
Bacup	315
Rawtenstall	356
Darwen	336
Todmorden	261
Padiham	211
Uppermill and Greenfield	163
Radcliffe	157
Haslingden	148
Colne, Foulridge	140
Golborne and Ashton-in-Makerfield	119
Denton	112
Ramsbottom	106
Clitheroe	104
Newchurch	91
Littleborough	84
Great Harwood	72
Warrington and Culcheth	63
Lancaster and Caton	29
Nelson	23

¹ In 1903 the total number of spinning spindles in the United Kingdom was 44 millions. In addition there were 4 million doubling spindles.

ESTIMATES OF POWER LOOMS IN ENGLAND

(Names of places in this table stand for towns
and their surrounding districts.)

	Number of Looms.
Burnley	79,300
Blackburn	75,300
Preston	57,900
Nelson	39,000
Accrington	36,400
Darwen	28,700
Rochdale	25,100
Manchester	24,200
Bury	22,200
Colne .	20,500
Bolton .	20,100
Oldham . . .	18,500
Chorley	17,900
Todmorden	15,800
Glossop	15,400
Padiham .	13,000
Great Harwood	12,400
Haslingden . .	12,000
Ashton-under-Lyne	11,500
Farnworth .	10,600
Bacup	9,300
Radcliffe . .	8,900
Rawtenstall . .	8,800
Stockport	8,700
Chitheroe . .	8,100
Ramsbottom .	8,000
Wigan	7,900
Hyde	7,900
Stalybridge . .	7,100
Heywood	6,400
Leigh	5,900
Littleborough	4,200
Middleton	2,500

	Number of Looms. ¹
Warrington	1,900
Newchurch	1,900
Golborne	1,200

DISTRIBUTION OF COTTON OPERATIVES IN LANCA-
SHIRE AND THE VICINITY ACCORDING TO THE
CENSUS RETURNS OF 1901²

County Boroughs, Municipal Boroughs, and other Urban Districts.

Blackburn	41,400
Bolton	29,800
Oldham	29,500
Burnley	27,900
Manchester and Salford	27,200
Preston	25,000
Rochdale	14,800
Darwen	12,500
Nelson	12,400
Bury	10,700
Stockport	9,700
Ashton under-Lyne	8,600
Accrington	8,300
Colne	7,300
Heywood	7,300
Stalybridge	7,100
Todmorden	6,900
Rawtenstall	6,600
Hyde	6,500
Chadderton	6,400
Haslingden	6,100
Bacup	5,900
Chorley	5,900

¹ The number of looms in the United Kingdom in 1903 was 684 thousand.

² The proportions of operatives engaged in spinning and preparatory processes to those engaged in weaving-sheds is roughly as 2 to 3. For the total number of cotton operatives see p. 81.

Farnworth	5,700
Leigh.	5,000
Great Harwood	4,900
Middleton	4,900
Radcliffe	4,800
Crompton	4,600
Royton	4,600
Padiham	4,300
Wigan	4,300
Mossley	4,200
Ramsbottom	4,200
Oswaldtwistle	4,100
Dukinfield	4,000
Walton le-Dale	3,900
Clitheroe	3,300

The recent tendency for spinning and weaving to dissolve partnership for the second time in the history of the industry is traceable in some measure to the economies which arise from conducting such an industry as spinning upon a very large scale with a high degree of specialisation, combined with the different requirements of spinning and manufacturing in respect of the quality of management. The latter fact accounts also for the extent of joint-stock organisation in spinning, as compared with the far more limited joint-stock enterprise in the sphere of manufacturing—a contrast which is observable also abroad. It is noticeable that it is only in spinning—not at all in manufacturing—that “trust” organisation has appeared: the Fine Cotton Spinners’ and Doublers’ Association was founded in 1898, and hitherto it has succeeded in earning high dividends. Again, with regard to the separation of spinning from weaving, I am inclined to think that a partial explanation of recent developments is to be

found in the different degrees in which the markets of Lancashire have developed. Roughly speaking, there are three markets in the Lancashire trade—the market for cotton at Liverpool, the market for yarns and the market for fabrics at Manchester. The cotton market is by far the most developed of the three, while the market for fabrics is the least developed.

Development means the growth of specialism and of the adaptation of means to ends, from which economies must result. When market functions (that is the operations of buying and selling) are conducted largely by a special class of buyers and sellers, whose sole business it is to deal with one another, the market in question may be classed among developed markets. Under primitive industrial arrangements the employer performs roughly four distinct functions—he is buyer of material, seller of his produce, works manager, and entrepreneur. In such case there is little specialism. But the tendency of modern industry is for one person to manage the works with perhaps sub-managers of departments under him, for others to confine themselves to directing the general policy of the business, for other persons to sell, and yet others to buy. This specialisation of buying and selling within the firm marks an important stage in market development. Another important stage is marked by the appearance of specialist dealers.

The function of the works manager is to produce commodities at the lowest cost by rearranging his factors in production, according to changing conditions, and continually substituting suitable factors in production for unsuitable ones. One of the chief functions of the dealer is to anticipate demand and spread supplies in time as well as in space in so far as the character

of the supplies permits of it—perishable commodities could not, for instance, be held up against future demand. Thus his duties, in respect of demand, are twofold, generally speaking: to discover where things are wanted most and to gauge what the state of demand will be in the future. If the latter function be exercised by those who are not specialists, estimates of future needs will seldom tend on the whole to approximate to facts. Dealings with respect to the future must take place; the question is whether they should be confined to experts, and whether they should be facilitated. Anticipation runs throughout our economic organisation: when a person enters a shop to buy a hat he expects to find hats to choose from; he expects, in short, that the shopkeeper will have anticipated consumers' needs and taken certain risks. The manufacturer, too, may have taken certain risks, or he may have produced only on order.

It is not difficult to follow the thread of risk in anticipation as it runs throughout the cotton industry. A dealer, let us suppose, requires certain quantities of a particular cotton fabric at certain prices, and he applies to the manufacturers, but the prices at which the latter can take orders without speculating depend upon the prices that must be paid for yarn. The manufacturers, let us suppose, approach spinners directly or indirectly with a view to finding out at what price yarn can be procured for the fulfilment of the order, but the spinners in their turn cannot quote prices with safety unless they know at what figure cotton will stand at the time when the yarn must be spun. This account illustrates how anticipation is involved in business, and from it some idea may be gathered of the way in which

one group of risks might be handed on to retailers, while others might be handed back to the growers of cotton, or to a group of dealers. There are additional risks connected with the wages of labour and the prices of coal and so forth, but these, as less considerable, we may ignore in the present argument. In the cotton industry market risks are borne in a large measure by groups of dealers. The spinner when he takes an order for yarn for the future may always protect himself, though not quite perfectly, by buying "futures" in cotton. When the time came for the delivery of the cotton he might have to pay unforeseen "points on" to secure the quality of cotton that he required, were he covered only by the possession of "futures," but it is possible for him by paying a little more for his cotton on the whole to let these risks rest with a broker.

The explanation of the inadequacy of the cover afforded by the purchase of "futures" is simple. Contracts for "futures" in the case of American Upland cotton refer to "middling" grade. But there are many grades of cotton, and the differences between their prices are in a state of constant fluctuation. If a spinner in January requires at the end of May "middling fair," and its price is 5*d.*, while that of "middling" is 4*80d.*, by buying April-May "futures" he loses nothing through the price of cotton rising as a whole in the intervening period, say to 5*20d.* for "middling fair" and 5*d.* for "middling," but he does lose should the latter rise to 5*d.*, but the former to a higher figure than 5*20d.*, that is assuming that he had not foreseen the coming widening of the gap between the prices of the two qualities of cotton. Any grade of Uplands is tenderable against "futures," but only at prices fixed by arbitration,

and obviously under the conditions supposed the spinner will not be able to get "middling fair" cotton for 5'20*d.* however he may act. The number of distinct grades of cotton recognised, it should be observed, is considerable.

We must pause here to consider shortly the machinery by which the concentration and distribution of risks is brought about. Speculation on the cotton market is affected almost entirely by means of "futures," "puts," "calls," and "straddles." A "future" is a purchase for delivery at some fixed date in the future at a price which is settled when the contract is made. "Puts" and "calls" are termed "options," or sometimes "privileges", the two jointly constitute a "double option" A "put" is a power to sell cotton before a certain date at a price determined upon when the power is bought; a "call" is the reverse, namely, a power to buy at a price fixed in the present. By buying a "put" a dealer insures against the price of cotton falling, and by buying a "call" he insures against the price of cotton rising. They are called "options" because the buyer of either power has the option of exercising it. The "double option" is an insurance against market price moving either way, for the purchaser of a double option possesses the right of buying or selling cotton in the future at a price fixed in the present. But double options are little used on account of their highly speculative character. The "straddle" is a speculation on the gaps between the prices of different qualities of cotton or between the prices of "futures" with different periods to run. These gaps vary a good deal.

Cotton is bought and sold, as a rule, through "brokers" whose sole business is to buy and sell cotton. They are members of the Liverpool Cotton Association, which

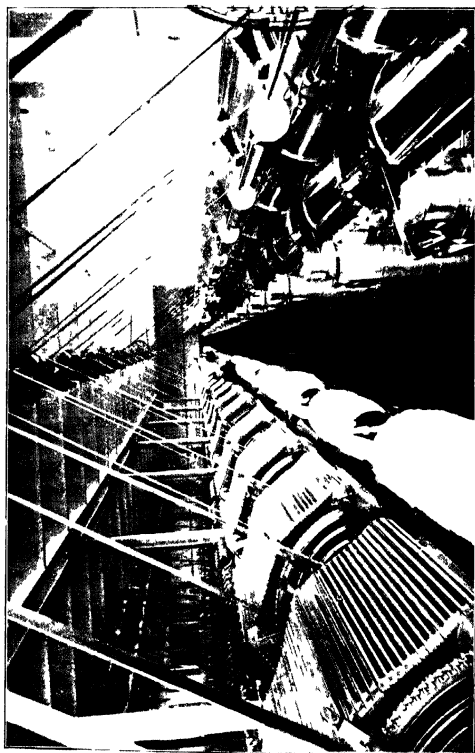
is an institution much like the Stock Exchange. The business done on the Cotton Exchange is settled up every week, when those owing differences on their purchases of "futures" must discharge their debts. "Differences" mean the differences between the prices at which purchases have been made and those quoted on settling-day. The debts are discharged through the Cotton Clearing House, which works like the Bankers' Clearing House, or the Railway Clearing House, and payments are made by vouchers representing demands on the Cotton Bank.

Among the buyers and sellers in a highly developed market are people who deal in what they neither possess nor require. Some of them never receive a delivery of cotton. Their buyings and sellings of cotton are determined by the relations between their estimates of demand and supply and those of others. Suppose that cotton is selling at 4*d.* per lb for one month hence, 4*d.* per lb. representing therefore the common expectation as to the demand for and supply of cotton in the future taken in conjunction with existing supplies, then, if a dealer's impression is that the future supply will prove better than most people imagine, he may, though owning no cotton at all, sell cotton for one month hence at 3½*d.* per lb. Such a dealer in effect backs his convictions, which are based upon information and general impressions, against the convictions of the market. If he proves right he gains, but if wrong he loses. Hundreds of people are acting in this fashion, and the market price of cotton is the resultant of their combined operations.

Let us consider now in more detail the case of the spinner. Cotton is offered at 4*d.* per lb. suppose, and

the spinner imagines that the price will fall. Suppose, further, that the yarn must be delivered in two months' time. Then two courses only are open to the spinner if there be no "futures." The one is to make his quotation on the basis of the present price of cotton, that is at $4d.$ per lb, and acquire the requisite cotton at once, the other is to rely in some degree upon his judgment, that is to anticipate and speculate. He is under the impression, let us suppose, from what he knows of demand and from what he has heard of cotton supplies, that the price of cotton will drop, he thinks it may drop to $3\frac{1}{2}d.$ before it is needed in his mill, and he books the order on the chance of cotton falling to $3\frac{1}{2}d.$ He may be right or he may be wrong, but it is not desirable that spinners should make these guesses as a rule. For a spinner either devotes most of his time to industrial problems—and in that case the chances are that he will form as many mistaken judgments as correct ones when he guesses as to the future price of cotton—or he devotes most of his time to studying the cotton market, and becomes less efficient as an industrial organiser than he would have been had he confined his attention to the problems bounded by the four walls of his mill.

Should the spinner take the safe course and buy cotton before it is needed, a serious loss to the public may result. For, supposing the price of cotton would have fallen in the future from $4d.$ to $3\frac{1}{2}d.$ had it been bought only as the need for it arose, the collection of stocks of cotton in the mills for future use at the beginning of the period imagined would mean the locking up of cotton when it was scarce. The price of cotton would therefore rise at the beginning of the period above $4d.$ and the price in the future would fall below the



3½d., since some of the demand of the future would have been met by anticipation out of the supplies of the past.

If the risks to which I am referring be taken over by a group of specialists, two advantages might result. (1) The average efficiency of manufacturers might rise, because, firstly, each manufacturer would be able to devote more attention to industrial problems, and secondly, the more capable manufacturers would more easily displace the less capable, since the inefficient works manager would be prevented from maintaining his position in the market by virtue of his success in securing his cotton on the best terms. (2) Again, more accurate anticipations in respect of cotton supplies would tend to be made, and cotton would be more satisfactorily spread. Suppose there is a large supply of cotton now and supply will be short a few months hence. Then, if there be no specialised cotton speculators it is probable that an insufficient quantity of the present stock will be held against the future. But if specialists operated on the cotton market, speculative buyings would tend to exhaust the present stock and increase the future stock enough to level the price. With anticipating well done stocks are more evenly distributed, the consumer is benefited, and manufacturing is rendered less risky. But there is always the fear that disturbances may be created by gambling in the developed market; and, again, that some dealers by tampering with the market may unsteady prices, rob the public, and at the same time rob one another.

Let us pursue this question further, for it is by no means simple. The effect on prices of speculation in cotton may be traced theoretically or inductively. By

the former method we can reach only hypothetical conclusions. For instance, it is certain that if those who speculate are possessed of special knowledge in matters relating to the demand for raw cotton and its unstable supplies, their operations must result in a smoothing of prices, under certain assumptions, since the estimates of the majority would tend to be more frequently right than wrong. By benefiting themselves speculators would benefit the public, through causing some portion of the cheap supplies to be held against anticipated scarcity.

Those whose operations tended to unsteady prices would be driven from the market by their losses. Thus a process of survival of the fittest would leave persons possessed of an extraordinary instinct for feeling market forces in control of the field where cotton and "futures" based upon it are sold and bought for the sake merely of differences. This is indubitable, it has been said above; but it is indubitable only on certain assumptions. One assumption is that the cotton is not "cornered." If the cotton be "cornered," a monopoly price may be realised for it, and everybody will lose except the man or syndicate working the corner. But cotton is very difficult to corner for numerous reasons. The value of the crop is enormous. The operations involved could scarcely be kept secret, since everybody on the cotton market is dealing in the same commodity. To corner a given stock on the Stock Exchange is not so difficult perhaps, since the operation is hidden by the multiplicity of dealings in other stock. Moreover, the gains to be derived from a corner are rather problematical. An appreciable rise in the price of cotton checks its consumption for a time. Cotton

goods are not like bread; people can wait and darn their old clothes, but they cannot eat the same loaf twice. The check on production, no doubt, is damaging to the labour and capital engaged in the cotton industry, but the fact that it can take place gives pause to would-be cornerers. And since the market may easily get wind of a projected corner, there is the danger of counter-rigs.

It is probable that few complete corners in cotton have been attempted, and of these very few, if any, have succeeded. It is asserted, however, that "squeezes" are not uncommon, that is, the cornering of remainders of the stock at the end of a season. If the new crop comes late into sight, a "squeeze" might prove highly profitable to those who had engineered it. Hitherto, however, no satisfactory evidence has been forthcoming to prove that "squeezes" are frequently attempted.

"Cornering" is not the only incident which would damage consumers. There is tampering with the market—"bearing" in order to buy with advantage, and "bulling," in order to sell with advantage. But observe that in a market of experts much of such "bulling" and "bearing" deceives nobody. The people liable to be deceived are soon pressed out of the market through the losses occasioned by their credulity. It may be taken as highly probable that on the whole prices are smoothed by expert buying and selling. Exceptions may occur, but the gain in general should be worth the price paid.

Somebody must speculate if wants are to be anticipated, and if wants are to be anticipated, the more the anticipation is concentrated and specialised, the better.

But the question of the effect of speculation upon

prices is not yet settled. There is the gambling public, which possesses no special knowledge of cotton supplies and the demand for cotton, to be taken into account. *A priori* one might argue that they could do no harm except to themselves, because as many mistakes would be made by them one way as the other, and the mistakes would therefore neutralise one another. However, this determination of the matter is not satisfactory. The public is liable to be seized by panic, and to be over-sanguine spasmodically, and its operations might usually depress falling prices unduly and over-stimulate rising prices. Besides, the public may be misled by false rumours and operations upon the market intended to deceive them. Against these dangers the expert is immune as a rule owing to his experience. Hence the presence of "outsiders" among speculators may cause speculation to unsteady the market. But the "outsider," be it noted, is discouraged to-day by brokerage and commission charges.

Thus far deduction will carry us, but it leaves us with no complete answer to the question, What is the effect of speculation on the market when outsiders are there in force? I am premising that the organisation of a developed market, with its clearing-house and cotton bank and quoted "futures," aids and excites speculation. The question propounded above ultimately takes the form, Should such organisation be suppressed or in some degree curtailed? Should dealings in "futures," for instance, be prohibited? Now, returning to the original question, we find ourselves beset with difficulties in seeking for an inductive solution. The past was sufficiently unlike the present to render a comparison of it with the present almost worthless, hence it profits little to compare the oscillations of prices prior to 1860,

say, with those of to-day. And it is of little avail to compare conditions in a market that admits "futures" with one that does not, since on the one hand demands will be different in the two markets, and on the other hand the prices in the one will influence those in the other in a large degree. Another line of investigation has also been tried, but it need not be described here, since it is complicated and has led to no important results.¹ The only conclusion that can be laid down with complete certainty is that could the outsider be removed, the tampering with the market by the publication of insincere reports be prevented, and cornering be rendered impossible, the magnitude of the benefits conferred on the public by speculation would be considerable. Probably as a result of speculation price movements have been rendered more frequent, but gradual movements have taken the place of violent oscillations and the range within which price movements take place has been reduced.

The markets in yarns and fabrics are developed in a much less degree than the cotton market. The fundamental cause is that cotton is more gradable within a manageable range of groups than either yarns or fabrics. When commodities can be graded satisfactorily they may be bought without being inspected, and also bought for delivery in the future, since the uniformity of the grades is preserved as closely as possible. Much raw produce lends itself to grading, since the crop of one year is closely the same in quality as that of a previous year which is not very remote; at any rate, it is not so different that it cannot be sorted into the old classes. Grading can also be applied to commodities that show

¹ The method was suggested in the *Economic Journal*, December, 1904

uniformity through being produced by machinery. Some American firms have adopted the policy of cramping their output with the object of securing the conveniences of grading as well as the economies of standardisation and the production of a few types on a large scale. Generally speaking, however, the further a commodity has advanced to the finished state, the less grading can there be, because the more finished the commodity is, the greater is the potential range of classification that may be applied to the commodity. In the markets of the cotton industry there are more grades of fabrics than of yarns, and more of yarns than of raw cotton, hence grading can be simpler and more perfect in the cotton market than in the yarn market, and in the latter than the market for fabrics. The cotton market should be more developed than the yarn market, therefore, and the yarn market than the market for fabrics. The effect of grading is to bring future supplies into present consideration, but for obvious reasons the degree in which a future period is effective in present dealings varies inversely on the whole as its distance from the present.

The question will naturally arise as to whether the industry has been rendered more stable as a result of specialised organisation in both production and distribution. Such a question it would be difficult to answer *a posteriori* owing to composition of causes and intermixture of effects, but *a priori* one would expect the development of anticipation to bring about greater continuity of employment. The advance of civilisation, we must notice, has witnessed concurrently a broadening of the market, that is of the influences that are brought to bear on each industry, and a liberation of demand from custom, united with greater purchasing power and a

widening range of choice. Has the joint effect of all these changes, we may ask, been increasing or diminishing stability? Again, I think it would be difficult to say. Certainly there has been a great gain from them in respect of the satisfaction of the needs of the community, and probably industries are steadily growing in the mobility and adaptability by which many of the changes affecting them are rendered harmless both in their bearing upon the earnings of working and of property. It may be of interest to quote here a table from Tattersall's Cotton Trade Circular for 1904, which shows the recent ups and downs of the spinning trade.

TWENTY-ONE YEARS' RELATIVE PROFITS AND LOSSES
IN SPINNING.

Year	No of Companies examined	Profit £	Loss £	Average per Company		Yearly Ave div paid
				Profit £	Loss £	
1884	60	125,000	—	2,083	—	5
1885	87	—	2,730	—	31	2
1886	90	—	61,718	—	686	3
1887	88	86,810	—	986	—	4½
1888	85	250,932	—	2,925	—	5
1889	86	220,587	—	2,565	—	5
1890	91	384,050	—	4,220	—	7
1891	101	38,758	—	383	—	5½
1892	99	—	94,770	—	957	1½
1893	99	—	60,790	—	613	1
1894	94	4,491	—	48	—	1½
1895	94	63,167	—	672	—	1½
1896	94	49,631	—	528	—	1½
1897	94	157,570	—	1,676	—	3
1898	90	271,804	—	3,020	—	4½
1899	86	381,176	—	4,432	—	6½
1900	80	344,548	—	4,307	—	7½
1901	80	279,545	—	3,494	—	7½
1902	85	—	1,436	—	16	4½
1903	90	—	45,322	—	503	3
1904	90	31,729	—	352	—	2½

A review of the whole of the trade is not made in this table, but probably the very large number of businesses included renders the results true for the trade generally, apart from fine spinning, since no Bolton mills are included. The last column does not give the average net earnings per unit of capital engaged, the reader must be warned, since the dividend is reckoned on the share capital paid up, without regard to the amount of loan capital. Hence the last column must not be compared with similar figures for other trades; the proportion of share capital to loan capital might vary considerably between trade and trade. Again, in an average good and bad are grouped together, and the earnings, therefore, to be expected from the most modern equipments and efficient management would be higher than averages indicate—in 1904, for instance, the dividends on spinning shares ranged from 10 per cent. (paid in numerous instances) to *nil* (which was even more common). Dividends, of course, do not even show perfectly the ups and downs of trade, since portions of the high earnings of the best years are held back for reserves and renewal funds. Trade oscillations are always more intense than those exhibited by tables of dividends.

This will probably be the most suitable place to discuss broadly the bearing of modern industrial and commercial organisation, as exhibited in the Lancashire cotton industry, upon social well-being. The defects commonly attributed to it may be stated under four heads, thus: (1) the narrowing influence of specialism on human life; (2) the unhealthiness of big towns, (3) the ugliness of the surroundings of a factory system; (4) social cleavage, and the unequal distribution of wealth and employment.

As to the first class of defects something has already been said. Specialism need not be narrowing in the sense intended, since it invariably leads to a demand for more knowledge on the part of the person specialising; and the foundation of all knowledge is broad. Specialism should, therefore, tend ultimately to broaden rather than to narrow life. Ultimately everything depends on the use made of specialism and the response of the community to the need of it; that is, whether it is good or bad depends upon our moral force and insight. Specialism in industry that never gets beyond making men machines is abominable, and specialism in dealing, such as is exhibited on the cotton market, so far as methods are employed which unsteady price, does more harm than good. The best will not be got out of developed markets until the first aim of dealers generally is to function efficiently and not to make a fortune speedily.

To the allegation that unhealthy big towns must result inevitably from the factory system the response may be made: (a) that in the economy of the future very big towns may not appear; and (b) that a big town need not be so unhealthy as to-day it undoubtedly is. Town life may in numerous instances represent quite moderate aggregations of people in the future, because the means of transport have so wonderfully improved, and because specialism and standardisation in the subsidiary industries have rendered it unnecessary for them to be carried on in immediate proximity to the industry which they subserve. It is difficult in a big town to arrange for an economical system of shifting goods direct from the factories; factories in small places, by means of private railway sidings, may get material

and distribute their goods at one handling less in each case than is usual among the factories in the large towns. Diminishing cost of carriage, united with economies in handling, is rendering it less and less disadvantageous for production to be carried on far from the consumers. In Lancashire, as we have noticed above, the decentralisation of specialisms is far advanced. The gigantic factory town in the cotton industry is a thing of the past. A traveller through Lancashire will find spinning and weaving being carried on in innumerable small towns—even villages—containing only a few mills, as well as in the bigger places with manufacturing traditions, such as Bolton, Oldham, and Rochdale.

Further, a big town ought never to have become so unpleasant a place as we have allowed it to become. Many large towns on the Continent are comparatively delightful places to live in. The unpleasantness of most big towns is due to haphazard growth (no thought having been given to appearance or the need of open spaces, whether in the present or the future) and to the smoke nuisance. The expansion of towns could be controlled, parks could be provided, and streets could be planted with trees. The chief obstacles to the towns of the future being a great improvement on those of the past are, firstly, our disinclination to interfere with our neighbours, and consequently our unwillingness to curtail people's liberty to use the land that they possess exactly as they wish; and secondly, the blasting properties of smoke. Vegetation cannot thrive in the smoke-laden atmosphere of a modern manufacturing town. The most appalling sight in factory districts is the tall chimneys belching forth volumes of dense and poisonous fumes, which damage health,

destroy nature, and make a pall which overhangs the locality and effectually blocks out half the sunlight. The destructive effect of the smoke on vegetation can be seen miles away from districts where the smoke is made. In many parts of Lancashire, for instance, production is carried on in a number of small places a few miles apart. The conditions of life in these places would not be bad if the intervening patches of country were country-like. But they are not, the grass is black, the trees are stunted and comparatively leafless—the land is a blighted waste which must be neglected because little or no use could be made of it. Perhaps the greatest social need at the present time is an effective smoke-consuming device that is not very costly, and from what has been done already by inventors on the problem of smoke consumption the satisfaction of this need may not unreasonably be looked for in the not distant future. When a suitable plan is hit upon, in order to secure its universal adoption we shall need the effective demand of the people for pure air on the one hand, and the strong Government to enforce the public will on the other hand. At least half the unpleasant things in the world are suffered because the majority of people do not care much whether they exist or not.

We have urged above that the big town might be made less objectionable, but many of its inhabitants would still suffer from the disadvantage of not living within easy reach of real country. For that reason the smaller town is ideally the best—the smaller town which is nevertheless large enough to maintain efficiently the conditions of cultured society, such as libraries, associations, and theatres. It might be complained that a factory

town, even if small, is hideous. The right answer to the complaint is that its hideousness is not essentially connected with the factory system. A great factory might be architecturally imposing, and the operatives' houses need not be ugly and arranged with depressing uniformity. The fault lies not with the factory system, but with people's carelessness about the æsthetic aspect of things, the ineffectiveness of the demand of the individual when production is organised to meet the wants of the million, and the causes already analysed of the character of modern towns. There is no reason at all, however, why there should not be more variety about cheap residences, since houses are not turned out like screws from automatic machines. And there are many advantages apart from economy associated with production in factories. Sanitary conditions can be more easily enforced, and the hours of work can be more easily regulated under the factory system than under the domestic system, and, further, when the former system prevails the home is not regularly littered or choked with the implements of production. The idea of working at home is attractive, but not so the idea of living in the workshop. Certainly the domestic system as it survives in this country has not been conducive to bright and cheerful homes.

The defects grouped under heading (4) above are mostly fictitious. Social cleavage is certainly less marked to-day than ever it was. We must not pause here to analyse the causes, but in my opinion they are in part the outcome of the factory system. Undoubtedly, again, the operatives' earnings are higher than they would have been had no industrial revolution created a new world for us. Whether other classes have

benefited in a greater degree than the operatives or not, we cannot afford space to consider here. It has nothing to do, observe, with the question of whether it would not be desirable, *ceteris paribus*, for low earnings to be higher and large incomes to be smaller. The question of unemployment I intend to avoid here deliberately. An adequate examination of it would be lengthy, and an inadequate analysis would cause misapprehension. I may state my view, however, that the most that could be proved is an increase of temporary displacement of labour, the length of which might be reduced considerably by a variety of perfectly harmless expedients, and that such increase, if it exist, is far more than offset by the greater wealth which the conditions giving rise to it have caused.

CHAPTER IV

BRITISH TRADE AND FOREIGN TARIFFS

IT will be convenient to begin this chapter with a broad statistical review of the course of British trade. Side by side with this have been set the imports of cotton.

Year	Imports of Raw Cotton, million lbs	Raw Cotton re exported, million lbs	Exports of Cotton Yarns and Manufacture, million £s		Total.
			Yarns	Manu- factures	
1700-5	1 17 ..	— ..	— .	—	—
1771-5	4·76 ...	—	— .	—	—
1785-9	— ...	—	— .	—	1 07 ¹
1791-5	26·00 ...	— .	—	—	2 09 ¹
1816-20	139 00	10 6	2 5	13 8	16 30
1831-5	313 00	23 0 .	4 8	14 2 .	19 00
1851-5	872 00	124·0 ..	6·8	24 9 .	31 70
1876-80	1,456·00 ..	180 0 .	12 4	56 1	68·30
1891-5	1,746 00 ..	217 0 .	9 7 ...	56 6 .	66 30
1896-1900.	1,798 00 .	223 0 ..	8 9	58 2	67·10

The value of money was the same in the periods 1831-5, 1851-5, and 1876-80. The sums of Sauerbeck's index numbers² for these periods were 454, 451, and

¹ Official values.

² Index numbers of prices are numbers calculated from the prices of the commodities in a given large and representative group of commodities from time to time, and may be taken to vary as prices on the whole, and, therefore, to measure their changes.

447 respectively. Great falls in prices took place, however, in the last two periods. The figures £90 millions and £91 millions would have been reached in the periods 1891-5 and 1896-1900, respectively, had prices in general remained constant. In the last half-century the increase in the world's output of cotton goods has been immense. It is due partly to the growth of population, partly to the increase in productive efficiency and well-being, and partly also to the substitution that has taken place of cotton fabrics for woollens and linens.

The growth of the cotton industry in early days was impeded by fiscal regulations. When Arkwright had constructed a workable water-frame it was discovered that the yarns spun upon it, which were firm enough for warps, could not be used much for that purpose, since the use of printed goods made entirely of cotton was prohibited by law. The object of the legislation had been the protection of the British cotton-linen industry against the all-cottons of India. In 1774 the Government sanctioned the new manufacture of all-cottons (which had been rendered possible by the production of twist on the water-frame), greatly to the dissatisfaction of numbers of Lancashire manufacturers, whose policy had been to throw every possible obstacle in Arkwright's way. But although prohibition was removed, a fiscal burden remained, since the tax on printed linens was extended to printed calicoes. At first the excise was 3*d.* per yard; it varied from time to time, and it was not removed until 1831. Unprinted goods were also taxed in 1784, but as a result of the representations made from Manchester the new taxes were repealed the next year.

The raw material for the industry bore its share of fiscal burdens also. An import duty was imposed on raw cotton in 1798. It varied from time to time between 1*d.* and 2*d.* per lb., that is, between 10 and 20 per cent., *ad valorem*. Cotton grown within the empire was taxed less than foreign cotton, and between 1821 and 1828 the cotton of any British colony or plantation in America and of Malta, if imported direct, was admitted free. The taxes on cotton-wool were not removed until 1845. The rates stated above were those charged when cotton was brought in English ships; under the operation of the Navigation Acts cotton-wool imported in foreign bottoms was more severely treated.

The greatest shock that Lancashire has ever felt was experienced when the Civil War broke out on the North American continent with an unexpectedness which prevented the possibility of any preparations being made in Lancashire. Englishmen were incredulous as to the chance of the English-speaking populations of two contiguous areas, which had previously lived under the same government, proceeding to the extremity of making war upon one another; and war having broken out, it was not immediately realised that the supply of cotton from the country which provided 85 per cent. of the raw material used in Lancashire cotton mills would be checked. At the Christmas of 1860 a four months' supply of cotton was held in Lancashire, together with a stock of cotton goods capable of meeting the foreign and home demands for about five months to come, according to estimates. That no immediate alarm was felt may be gathered from the fact that the cotton market was dull for the

greater part of 1861 and that prices scarcely moved until towards the end of the year. A considerable rise in price became inevitable after the Federals had declared a blockade of the Southern ports and were taking steps to render it effective. In the October mills in Lancashire began to run short time. As early as February 4th, 1861, the Provisional Government of the Southern States, under the title, the Confederate States of America, had been constituted. before the close of 1860 South Carolina had pronounced the union between herself and other states dissolved.

The rise in the price of cotton was ultimately enormous. The extreme prices of cotton stood thus in 1864 and four years before —

	(In pence per lb.)			
	1860.		1864	
Upland	7 $\frac{1}{4}$	to 8 ..	24	to 32 $\frac{1}{4}$
New Orleans	8 $\frac{5}{8}$	„ 9 ..	25	„ 33
Sea Island	26	„ 26	60	„ 74
Surat	5 $\frac{1}{4}$	„ 5 $\frac{7}{8}$	16 $\frac{1}{2}$	„ 27 $\frac{1}{2}$

By the November of 1862 Lancashire was plunged in the deepest distress, and such was the independence of many of the operatives that it was only through the inquiries and house-to-house visitations of members of relief committees that some of the most painful cases were brought to light and assisted. So extensively did poverty spread that the proportion of the population relieved approached 50 per cent. in certain places, having increased sometimes to more than thirty times the normal percentage. The country was helpless in the matter of the cotton-supply. Interference would probably have proved futile: for America lay far away, and any action to bring in cotton might conceivably have

operated in keeping back corn. Besides, Lancashire on the whole was staunch in its disapproval of the use made in the South of slave-power. The good-will and fortitude of the Lancashire operatives were appreciated in the Northern States, whence some contributions to the relief funds were received.

As soon as distress became acute, local committees, a Mansion House Committee, and a Central Committee were formed. Funds flowed in from all sides. From North America itself more than £1,200 was transmitted, and from Australia as much as £52,000. All districts, all classes, and almost all nations contributed, and the committees found it possible to preserve Lancashire from the horrors of famine. In all £1,661,679 was distributed by the various committees. £419,692 was derived from the Mansion House Fund, and £841,809 from the Central Committee. To the sum total of £1,661,679 must be added contributions in kind, which have been estimated at about £112,000 in value, and the relief accorded by the Poor Law Guardians. During the three years ending Lady Day, 1864, the Guardians spent in relief £1,937,928, as compared with an expenditure in 1861 of £313,135 only. The assistance given to those in distress, directly or indirectly, in consequence of the cotton famine must have reached some £2,750,000, and the total loss to Lancashire must have been almost incalculably heavy. The poverty to be relieved, it must be remembered, was not only that of the cotton operatives, for the distress of one class spread to others, and small tradesmen were as much starved by the loss of custom as factory workers by the dearth of cotton.

One good effect of the cotton famine was the encouragement that it gave to the cultivation of cotton

elsewhere than in America, particularly in India, and the stimulus which it exerted, in consequence, on inventors and machine-makers to improve the machinery used in Lancashire in such a way that it might deal successfully with short-staple cotton. Undoubtedly a step in advance in respect of technical matters was taken in the 'sixties," and the close of the "sixties" saw cotton mills satisfactorily working upon material which would have been rejected as incapable of treatment economically in the later "fifties"

In the course of the nineteenth century a remarkable change took place in the direction of British exports of cotton goods. In 1820 Europe received about half the cotton fabrics which were sent abroad, while the United States received nearly one-tenth and Eastern Asia little more than one-twentieth. By 1880 Europe was taking less than one-twelfth, the United States less than one-fiftieth, and Eastern Asia more than a half. Our exports of yarns to the Continent have not fallen away relatively in the same proportion. The destination of our goods to-day may be read from the table annexed.—

VALUE OF COTTON EXPORTS FROM THE UNITED
KINGDOM INTO THE FOLLOWING COUNTRIES FROM
1897 TO 1901

(000's omitted)

GERMANY.

	1897.	1898.	1899	1900.	1901.
	£	£	£	£	£
Cotton yarn	1,768	1,854 .	1,894	1,763	1,573
Cottons	1,882 ...	1,762	1,770	2,081	2,144

HOLLAND.

Cotton yarn .	1,301	1,012	786	983 .	957
Cottons . .	1,012 ...	1,061 ..	992 . .	1,008 ...	953

BELGIUM.

	1897.	1898.	1899.	1900.	1901.
	£	£	£	£	£
Cotton yarn .	294	313 ..	236 ..	247 ...	231
Cottons .	1,398 ...	1,557 .	1,670 ..	1,991 ...	1,432

FRANCE

Cotton yarn .	357 ..	234	195 ...	289 .	410
Cottons .	519	424 ...	462 .	562 .	556

TURKEY.

Cotton yarn .	787 .	778 .	644	393 .	659
Cottons	4,265 .	3,818	3,262	3,159 ..	4,589

EGYPT.

Cotton yarn .	186	176 .	161	155	177
Cottons .	1,723	1,415	1,547 ...	1,897 .	2,321

CHINA.

Cotton yarn	333 .	365	307 .	85	249
Cottons .	4,330	4,460	5,430 .	5,150 ...	6,025

JAPAN

Cotton yarn .	1,041 .	699	580	699	438
Cottons .	1,042 ..	1,099 .	1,035	1,667 .	863

UNITED STATES

Cotton yarn .	119 ..	138	225 ..	403 ..	274
Cottons .	2,513 ...	2,062 ...	2,751 ...	2,902 ...	2,641

BRAZIL.

Cotton yarn .	102 ..	75 ..	59 ..	71 ...	39
Cottons .	1,771 ...	2,370 ..	1,715 ...	1,574 ..	1,073

BRITISH INDIA

Cotton yarn .	1,958 ...	1,595 ...	1,444 ...	1,485 .	1,630
Cottons .	13,738 ...	15,847 ...	16,902 ..	16,105 ...	20,052

WEST AUSTRALIA.

Cotton yarn .	— ..	— ...	— ...	— ...	—
Cottons .	95 ..	71 ...	76 ...	123 ...	118

SOUTH AUSTRALIA.

	1897.	1898.	1899.	1900.	1901.
	£	£	£	£	£
Cotton yarn .	—	—	—	—	—
Cottons .	224	248	258	270	240

VICTORIA

Cotton yarn .	—	—	—	—	—
Cottons .	869	927	858	1,075	917

NEW SOUTH WALES

Cotton yarn	—	—	—	—	—
Cottons	850	940	925	1,154	1,169

QUEENSLAND.

Cotton yarn .	—	—	—	—	—
Cottons .	279	293	373	330	261

CANADA.

Cotton yarn .	39	46	66	80	64
Cottons	727	825	918	1,088	1,111

The figures for a series of individual years have been given instead of averages in order to afford a notion of movements year by year as well as of the magnitude of the different markets. Absolutely many of these figures are quite inaccurate, owing to the difficulty of discovering the real destination of goods. Sometimes the exporter even does not know, his consignment being to an agent who passes the goods over another frontier. Even the destination which is known is not always returned or returned accurately. In 1904 the Board of Trade appealed to Chambers of Commerce and merchants with the object of getting more attention paid to the recording of ultimate destination. We may remark here that it is not only English figures which

suffer from the defect noted above, and further that classifications of imports by origin are even more untrustworthy.¹ We can easily comprehend, therefore, why no place is found in our trade returns for Switzerland and Bolivia, which have no seaboard. We need scarcely add, with reference to the table already given, (1) that the exports to countries traversed by goods intended for other countries will be too high, and (2) that the percentage of error may not vary greatly when alterations are not taking place in routes, and that therefore the movements in exports to each country may be contrasted relatively.

The explanation of the change in the directions of our cotton trade is threefold. On the one hand, industrialism has been developing rapidly abroad. The mean annual factory consumption of cotton of the United Kingdom, the rest of Europe, and the United States, which had been (in millions of tons) 1 59, 0·79, and 0 37 respectively in 1831-40, became 3 85, 2 45, and 1 45 in 1851-60, and 5 63, 4 27, and 2 74 between 1871 and 1880. By the early "nineties" the consumption of the Continent was well ahead of that of the United Kingdom. Our trade in yarns was the least affected and the last to be affected, because manufacturing (that is weaving) on the whole depends less than spinning upon the skill of the operatives, and many kinds of fine yarns cannot be produced so cheaply in a continental climate as in England, even by operatives of equal efficiency. On the other hand, our trade to the East was encouraged by reductions in the cost of

¹ On the question of the Accuracy and Comparability of British and Foreign Statistics of International Trade, see the Report of the British Association's Committee in 1904.

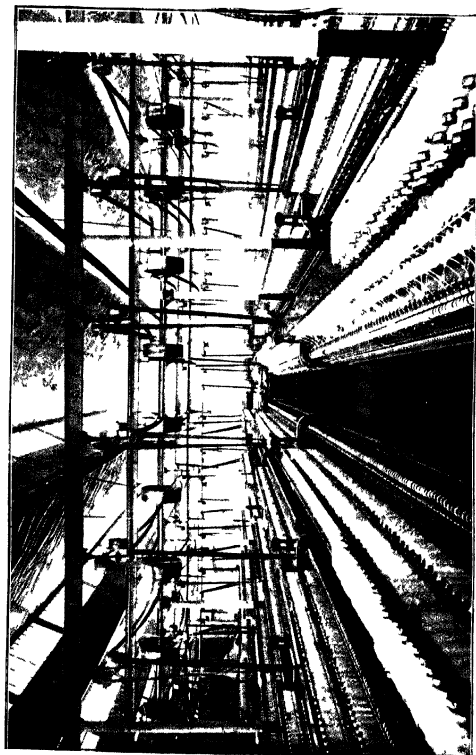
carriage and the opening of the East to Western commerce. The length of the journeys to India (particularly to places in the north-west, such as Bombay) and China^a was diminished by the completion of the Suez Canal. Moreover, the completion of the Suez Canal hastened the change from sailing vessels to steamers, and inaugurated a period of great enterprise in shipping and the shipbuilding industry, with the result that freights fell to a considerable extent in the few years following 1869. Further, trade with China was rendered easier on the conclusion of the second Chinese war in 1858, and particularly after the Convention of 1860. Prior to the first Chinese war our total exports of all commodities to China had been less than half a million in value.

By the Treaty of Nanking (1842), which concluded this war, certain facilities were accorded to commerce. It was stipulated that British subjects should be allowed to reside for the purposes of trade at Canton, Amoy, Foochowfoo, Ningpo and Shanghai, and Hong Kong was ceded to Great Britain. Trade increased somewhat, but not so much as had been expected. The Chinese did not adequately fulfil their treaty obligations, and after protracted negotiations a second war broke out, and the Treaty of Tien-Tsin (1858) was wrested from the Chinese Government. Under this treaty many points complained of by British traders were settled to their satisfaction, and British subjects were permitted to trade at New-Chwang, Tang-Chow, Tai-wan (Formosa), Chau-Chow (Swatow), and Kiung-Chow (Hainan), in addition to the places mentioned in the Treaty of Nanking. We are not passing judgment here upon our action in relation to the Chinese wars,

~~under~~ approving or condemning, but noticing merely some of their consequences. Within twenty years from the Treaty of Tien-Tsin our exports to China of all classes of merchandise, which, as we have seen, had been less than half a million in value prior to the first Chinese war, had nearly reached £4,000,000, and to-day the value of our exports of cotton fabrics alone to China (including Hong Kong) is considerably in excess of that amount. Moreover, throughout the second half of the nineteenth century Japan was showing herself increasingly prepared to lay herself open to Western influences and enter into treaties.

In addition to the trade between England and China, an important trade sprang up between the latter country and India. This in recent years has expanded enormously, as is shown in the chapter where the situation in the East is dealt with more fully. There is no doubt that of late years the development of a factory system for cotton-spinning in both Japan and India, like the same development on the European continent, has checked in some measure our export of cotton yarns to the East; but the losses of one of our industries are probably more than offset by the gains of others; in the long run the British Empire must benefit from the advance in India, and in all likelihood she will gain from that in Japan.

For a long time our trade with the whole of the silver-using East was disturbed by great fluctuations in the exchanges. There is no fixed par of exchange between silver-using countries and gold-using countries, and if the market ratio of silver to gold is subject to frequent and considerable changes, it is easily to be seen that trade between the silver-using countries and the



gold-using countries will be more awkward to manage than trade between countries using the same standard of value. The risks of fluctuating exchanges might be, of course, and actually have been, taken over by mercantile banks, but the profits of such banks, so far as they represented charges for taking these risks, would operate as a duty on exports. It has been alleged, moreover, that further difficulties were caused by values in the silver-using countries responding only tardily to changes in the ratio between gold and silver, but into the much-debated question as to whether customary prices rule on the whole in the East, we need not here enter. The degree of fluctuation in the exchanges became pronounced after 1873, on the dissolution of the Latin Union, and a remarkable fall in the value of silver followed. The United States slightly, but only very slightly, retarded the fall by its silver legislation,¹ which was adopted partially to hold up prices and partially to assist the silver interests. A strong bimetallic agitation was set on foot in England with the double object of securing a par of exchange with silver-using countries and checking the fall in prices. In this agitation Lancashire, owing largely to her trade with the East, played a leading part. In 1893 the English Government dealt with the difficulty as it affected Indian trade by closing the Indian mints, with the object of keeping the gold

¹ The Bland Act, 1878, provided for the monthly purchase of not less than \$2,000,000 and not more than \$4,000,000 of silver to be coined into silver dollars—by 1889 as much as \$350,000,000 had been coined under the authority of the Act. In 1890 the Sherman Act took the place of the Bland Act. It provided for the monthly purchase of 4½ million ounces of silver to be coined as required. This Act was repealed in 1893. As silver was depreciating all the time, the loss to the United States on the silver treasure amassed by it has been considerable.

value of the rupee stationary through restricting its issue. In carrying out this policy it has met with a large measure of success. Partially in consequence, the bi-metallic movement in England has sunk into comparative insignificance.

In colonial trade no change of any note has taken place. Almost all the importations of cotton goods into our colonies proceed from Lancashire. Canada alone of our chief colonies receives an appreciable proportion of her imports of cotton goods from another source, which is not remarkable in view of the proximity of the industry of the United States. Canada imported in the year ending in June, 1903, cotton goods to the value of £1,728,000; of these £540,000 worth came from countries other than England, and of the £540,000 worth nearly three-quarters were supplied by the United States. In 1903 Cape Colony received altogether £1,750,000 worth of cotton goods, of which only £200,000 worth were of foreign origin; while Australia imported of the same class of commodities, together with linen piece-goods, amounts to the value of £2,482,000 in all, £184,000 worth coming from foreign countries; and New Zealand of her imports of cotton goods, valued at £556,000, bought only £46,000 worth from foreign countries. The figures for British India are even more remarkable in showing a pronounced preponderance of British goods; of its total admissions of cottons, amounting to £19,981,000 on an average for the five years ending in 1902-3, so slight a value as £881,000 was attributable to foreign countries. These figures are of special interest with reference to the possible effects upon the Lancashire cotton industry of any

changes in our fiscal system. Burdens imposed upon imports from foreign countries would necessarily have reflected effects in a diminution of our exports. Our foreign trade in cottons would not escape bearing some share of the diminution. In what degree our various lines of export would be affected it is impossible to say *a priori*, but certainly they would not all be equally affected. The reduction of our exports would take place along lines of least resistance, which it would not be difficult to define, and it is quite conceivable that the cotton trade would not be one of the trades to suffer only slightly. But the important bearing of the figures just given is that losses in respect of our trade with foreign countries could not be recouped in any considerable degree through foreign goods being excluded from our colonial markets. Out of £26,500,000 worth of imported cotton goods, Canada, Cape Colony, Australia, New Zealand, and India bought less than £2,000,000 worth from foreign countries in the years for which figures are given above. In the periods examined above the foreign exports for consumption in all our Colonies and Possessions could not have exceeded £2,500,000, for more than 80 per cent. of our exports of cotton goods to our Colonies and Possessions were destined for the countries enumerated. We could, indeed, gain some ground by pushing the manufactures of India and Canada out of their own markets, but it is not to be imagined that the Colonies and Possessions would allow any of their industries to be damaged without a struggle. We must not enter here upon the question of colonial preference, and certainly it is not to be judged from the standpoint of one industry alone, nor indeed from the economic standpoint alone, but

a judicious conclusion can only be reached after the effects upon each line of British and colonial trade have been carefully thought out.

In view of the developments of the cotton industry abroad and in parts of the East, some people are apprehensive as to the prospects of the trade of Lancashire. There are no signs, however, in recent figures of the sudden coming of change, and as to the distant future it is impossible to speak, since it might witness a complete reversal of the fiscal systems pursued in most countries, and the lines of trade might so fall as to leave Lancashire producing a large proportion of the cotton goods consumed by the world. From existing indications, the worst that we need immediately fear, it would seem, is a considerable retardation of the rate of growth of our industry, gradually administered, which might bring the Lancashire industry to the stationary state. It is not adequately realised, in connection with the ups and downs of trades over long periods, that no suffering need be experienced in any industry so long as the profitable markets remaining to the industry are sufficient to keep the capital already invested fully employed and to prevent the destruction of plant and other fixed capital before it would otherwise be sacrificed, and so long as the industry remains of such a magnitude as to provide continuous employment for that labour which is already specialised in the industry. Under such conditions, nevertheless, the industry in question would be steadily shrinking, and were it of certain kinds, the shrinkage would take place at a rapid rate. It is no hardship to a would-be investor to find the average rate of profits standing at 5 per cent. in the cotton industry and 8 per cent. in the engineering industry, and to invest, there

fore, in the latter; and it is no hardship to a youth on the point of entering business to find the wages to be earned in the cotton industry below those obtainable in the clothing trades, say, and therefore to enter the latter. We have said above that "the worst" that Lancashire need regard as possible is some approximation to such a stationary state as that described above, but the expression "the worst" is inappropriate, for no loss is necessarily implied. Taken as a whole the country might find its position improved by some rearrangement of the lines of its trade, and the cotton industry might lose only in magnitude.

In a preceding paragraph we have considered what might happen were very rapid extensions of the cotton industry to take place abroad; but in point of fact Lancashire trade to-day is not in a dangerously declining state, and the home market, it must be remembered, grows steadily. An examination here of the most recent figures relating to the totals of our foreign trade may prove profitable.¹ The average exports were, in the periods 1881-90 and 1891-1900 respectively, in million £s:—

	1881-90.	1891-1900.
Cotton manufactures . . .	60·4	57·3
Cotton yarn . . .	12·3	9·3
Total	<u>72·7</u>	<u>66·6</u>

Since 1900 there has been a marked improvement. The average value of the exports in the years 1900-3 was 73·3 million £s. In interpreting these figures price movements must be taken into account: the average quantities sent abroad in the two contrasted decades

¹ A review of the chief lines of British trade will be found in the diagram and notes at the end of this chapter.

were 4,737 and 5,048 in millions of yards as regards piece goods, and 255 and 229 in millions of lbs. as regards yarn.¹ One would expect the prices of cotton goods of all kinds to fall as a result of improvements in productiveness, but the fall that would otherwise result in the value of our exports, to be counter-acted, in some degree, by the increased quantities sold at the lower prices, and by the substitution of superior for inferior goods. There may also have been a fall in prices unconnected with productiveness; in respect of such a fall the diminution in the value of our exports would be purely fictitious. The reduced value of exports, owing to general industrial advance we may note, is in a sense fictitious also, since the prices of other things will be lowered also, and therefore the lower values realised will not necessarily represent potentially smaller quantities of other commodities. General values in the two contrasted decades have fallen in the ratio of 75 to 66·3 (as shown by Sauerbeck's index numbers). Raising the values of our cotton exports in 1891-1900 in the ratio of the fall in prices, we reach a figure of 75·3 as contrasted with 72·7 for 1881-90. We may argue, therefore, that the apparent decline probably hides an actual advance. The results of the operation performed above are not closely accurate, since we have reduced the average exports of the ten years by the average index number for the ten years, instead of reducing the exports for each year by the index number for that year and then striking an average, however, any error that results from the method employed here is probably very small. That the decline in trade, as shown by a comparison of the trade figures of the last two decades of the nineteenth century, does not measure,

¹ See notes on the diagram at the close of this chapter.

or even indicate, a decline in production is evident from our consumption of cotton, which advanced $10\frac{1}{2}$ per cent (from 2'962 million bales to 3'270 million bales) in the periods under comparison. Further, it can be shown that we are exporting larger quantities of superior goods than formerly. Each yard of cloth and yarn exported, therefore, represents on the average a larger export of British manufacture, so to speak, than it used to do.

The view that the Lancashire cotton industry is not declining is still further corroborated by statistics of spindles and looms which have been returned officially as follows (in thousands):—

	Spindles (including Doubling Spindles)	Looms
1874 .	41,882	463
1878 .	44,207	515
1885 .	44,349	561
1890 .	44,505	616
1903 . .	47,856	684

The total quantity of labour power used in the cotton industry certainly increased steadily (the effect of the shock occasioned by the cotton famine being excepted) up to 1895, according to the returns of Factory Inspectors,¹ but the last census returns show for the first time a falling off in the numbers of operatives. However, the census figures do not indicate a diminution in the amount of labour power used, if a very moderate allowance be made for the different capacities of adults, young persons, and children. The decrease has taken place almost entirely in children: the class of young persons has slightly contracted, but

¹ See table on p. 112 of the author's *Lancashire Cotton Industry*, giving the numbers of operatives and proportions of each sex and age from 1835 to 1895. The totals for 1874, 1878, 1885, 1890, and 1895 were respectively 479,600, 483,000, 504,100, 528,800, and 538,900.

the number of adults has increased in a degree more than sufficient to counteract these losses.¹

No account of the trade in cotton goods would be complete which did not include a brief sketch of the commercial policies of the chief trading nations. We need not trace tariff history far back in detail for the purposes of this work—and indeed the space at our disposal would forbid it—but it is necessary to examine, if only in brief, recent legislation whereby the importation of cotton goods into the leading countries is encouraged or discouraged. I shall state here certain significant tariff alterations in recent years and conclude with a table of the duties that are levied at the present time.²

The import duties imposed upon cotton goods entering German ports were not immoderately high until the necessity of increasing the receipts from Customs, combined with protective leanings, led to the legislation of 1879. Previously the various States had contributed to the imperial exchequer and received back their share of the receipts from Customs duties. As a rule the balances were against the States, and the measure of 1879 was designed, in the first instance, to remove or reduce these unpopular balances.³ Secondly, however, the Act was designed to foster industrialism in Germany, and to this end the existing German industries were granted liberal protection. Under the Act of 1879 the import duties upon cotton goods were raised considerably. In 1885 the duties were raised again; but in 1888 and in 1891 reactions were experienced in

¹ The census returns of cotton operatives were 565,000 in 1891, and 546,000 in 1901.

² In this account I have closely followed Oppel's *Die Baumwolle*. Dr. Oppel's sketch, however, goes into greater detail than I consider is needful here.

³ See Dawson's *Protection in Germany*.

consequence of the attitude of the consumers and of those producers who were taxed through having to purchase, at high prices, goods which formed the material of their manufactures. German spinners desired heavy duties on yarns, but German manufacturers preferred to be left to exercise a free choice between home and foreign yarns and, therefore, were unwilling that the importation of yarns should be discouraged. France pursued, in respect of cotton goods, a most restrictive system until the famous Cobden-Chevalier Treaty inaugurated a period of easier trade under treaties of commerce, but since about 1880 more extreme protective beliefs have asserted themselves generally in France, and succeeded on the whole in completely reversing the main tendencies of her commercial policy.¹ In Austria a highly prohibitive system was ruling early in the nineteenth century, but at about the close of the first third of the nineteenth century some importations were allowed at high charges. From the middle of the century until 1878, there was a tendency for import duties to be reduced; in 1878, however, a violent reaction brought about another era of high tariffs. Both in 1882 and in 1887 the duties were still further raised, but under recent treaties of commerce some reductions have been effected. In Switzerland no sort of tariff barrier existed prior to 1851. In that year two francs a hundredweight were imposed upon yarns and manufactures alike: in 1884 the duties were raised. Belgium is only moderately protective. Holland admits yarns free and charges manufacturers with a simple 5 per cent. *ad valorem*. Russia acted upon the principle of rigid prohibition from 1822 to 1857: in 1857 foreign manufactures were admitted at

¹ See Meredith's *Protection in France*.

very high charges: later there was some abatement of import duties, but an inclination to increase them again ruled after 1880. All the leading countries make provision in their tariff laws for the concession of lower duties to countries which are prepared to grant a *quid pro quo*.

In American commercial policy four fairly well-defined periods are distinguishable. Until the war with England, towards the close of the great Napoleonic struggles, American policy was of a moderate free trade complexion. Thereafter, until about 1845, the protection of home industries was aimed at, but from that time until the Civil War a sensible reaction in favour of freer trade on the whole maintained itself. From the time of the Civil War the inclination to protection was never significantly departed from except by the Act of 1883. A climax was reached in 1890 by the McKinley tariff, and after a slight reaction in 1894 excessively high duties were renewed by the next tariff law. At the present day there are said to be strong Free Trade influences in the United States, but hitherto they have proved almost powerless to bring about even moderately untrammelled trade, with the single exception—if exception it can be termed—which has already been noted, namely, the Act of 1883. In the duties on cotton goods the general trend of American commercial policy is pretty closely reflected. In 1790 the duties on cotton yarns and piece goods were $7\frac{1}{2}$ per cent. *ad valorem*; they gradually rose until they reached the figure of 25 per cent in 1816. Some seventeen years later there were slight reductions, but further restrictiveness was resorted to in 1842, the duties reaching 30 per cent. A lowering of the duties followed, and then oscillations until a severe tariff was adopted in 1890. The severity

of the tariff of 1890 was repeated with emphasis in 1897 after the slight reaction of 1894. The present position is illustrated in the figures quoted below.

Most of the British Colonies tax some classes of imported cotton goods, but since 1903 the South African Customs Union and Canada have accorded preferential treatment to British cottons of the taxed classes and made provision for reciprocal concessions in inter-colonial trade¹

It is no simple task to compare with any degree of exactitude the tariff charges of different countries. Inasmuch as "cotton goods" include many different commodities, they may be grouped in few or many classes, and even if the classes adopted by any two countries correspond, the relations between the taxes on each class may not correspond. As one example of the minute tabulation which may appear in tariffs, we may quote here the following extract from the French tariff on a single class of cotton fabrics —²

TARIFF CLASSIFICATION

Tissues of cotton, plain, twilled, and ticks —

Unbleached

(a) Weighing 13 kilograms or more per 100 square

		Tariff Rates of Duty	
		Frs	Cts
metres, and containing in warp and weft in a square of 5 millimetres each side			
27 threads or less	. . . 100 kilos.	62	00
28 to 35 threads „	77	00
36 to 43 threads „	96	00
44 threads or more „	118	00

¹ The important Indian market, though admitting yarns and sewing thread free, charges 3½ per cent on piece-goods, but a countervailing excise of 3½ per cent is charged on all Indian manufactures finer than those woven from 20's and 20's. The New Zealand preferential scheme affects only sail-cloth and canvas as regards cotton goods.

² Quoted from the Memorandum of the Board of Trade on British and Foreign Trade and Industry (1903).

			Tariff Rates of Duty	
			Frs	Cts
(b) Weighing 11 and up to 13 kilograms of 100 square metres, and containing in warp and weft in a square of 5 millimetres each side				
27 threads or less	.	100 kilos.	70	00
28 to 35 threads	.	"	87	00
36 to 43 threads	.	"	107	00
44 threads or more	.	"	131	00
(c) Weighing 9 and up to 11 kilograms of 100 square metres, and containing in warp and weft in a square of 5 millimetres each side.				
27 threads or less	.	100 kilos.	90	00
28 to 35 threads	.	"	111	00
36 to 43 threads	.	"	138	00
44 threads or more.	.	"	172	00
(d) Weighing 7 and up to 9 kilograms per 100 square metres, and containing in warp and weft in a square of 5 millimetres each side.				
27 threads or less	.	100 kilos.	107	00
28 to 35 threads	.	"	131	00
36 to 43 threads	.	"	165	00
44 or more threads.	.	"	230	00
(e) Weighing 5 and up to 7 kilograms per 100 square metres, and containing in warp and weft in a square of 5 millimetres each side.				
27 threads or less	.	100 kilos.	129	00
28 to 35 threads	.	"	139	00
36 to 43 threads	.	"	199	00
44 or more threads	.	"	300	00
(f) Weighing 3 and up to 5 kilograms per 100 square metres, and containing in warp and weft in a square of 5 millimetres each side:				
27 threads or less	.	100 kilos.	230	00
28 to 35 threads	.	"	287	00
36 to 43 threads	.	"	360	00
44 or more threads	.	"	550	00
(g) Weighing less than 3 kilograms per 100 square metres				
	.	"	620	00
25 francs = £1.				

The difficulty stated above may be partially surmounted by a system of averaging. We may also obtain some idea of the comparative weights of different tariffs by taking merely typical classes of goods. Pursuing the second method, I have quoted below from Oppel's work the import duties imposed by different countries on four classes of cotton goods. The countries are ranged in the order of magnitude of the taxes, which are reckoned at the amount per 100 kilograms (nearly two hundredweight). The goods selected to form the basis of the comparison are as follows —

I. Number 36 yarns (English counts)

II. Unbleached calico woven from yarns below 50's with 38 picks to 5 quadracentimeters.¹

III Goods printed in three colours.

IV. Machine-made lace—25 kilograms to the quadrimeter.¹

TABLE OF IMPORT DUTIES IMPOSED BY VARIOUS COUNTRIES.

	£		£
Spain	10 2	Germany	8
Russia	4 5	Sweden	7
Portugal	2 9	Denmark	6
Greece	1 6	Belgium	·5
Austria-Hungary	1 7	Norway	·5
Italy	1 1	Roumania . . .	3
France	1 0	Switzerland	2
Servia	0	Netherlands	0

¹ A quadrameter is about 1·19 of a square yard and a quadracentimeter is about .0119 of a square yard. A kilogram is about 2 204 lbs.

UNBLEACHED CALICO.

	£		£
Russia	19 7	Belgium	1 9
Spain	12 9	Roumania	1 7
Portugal	3 6	Denmark	1 2
Germany	3 4	Servia	1 0
France	3 3	Norway	1 0
Austria-Hungary	2 7	Switzerland	3
Italy	2 5	Netherlands, 5 per cent.	
Sweden	2 4	<i>ad valorem.</i>	
Greece	2 15		

PRINTED CLOTH

	£		£
Russia	25 3	France	4 7
Portugal	15 4	Greece	3 2
Spain	13 8	Servia	2 8
Denmark	6 4	Belgium	2 6
Norway	5 3	Roumania	2 1
Sweden	5 3	Switzerland	1 5
Austria-Hungary	5 1	Netherlands, 5 per cent.	
Germany	5 1	<i>ad valorem.</i>	
Italy	5 0		

MACHINE-MADE LACE AND EMBROIDERY.

	£		£
Russia	137 3	Denmark	9 7
Spain	46 5	Sweden	9 6
Portugal	34 7	Roumania	6 9
Italy	24 1	Servia	5 5
Norway	19 1	Switzerland	3 4
Austria-Hungary	19 1	Belgium, 5 per cent.	
France	17 2	<i>ad valorem.</i>	
Greece	16 1	Netherlands, 5 per cent.	
Germany	14 9	<i>ad valorem.</i>	

The objection to the comparison instituted above is apparent. The duties on the different classes of cotton goods are not based by all countries on the same system of variation of the duty with the quality of the goods. It is conceivable that country X might impose a lower duty on the type of yarn selected (36's) than country Y, and yet the tariff barrier reared by country X against the cotton goods that could be taken from us in bulk might be on the whole more restrictive than the barrier opposed to possible imports of cotton goods by country Y. In order to avoid this source of error, I have stated beneath the mean rates of duty charged by different countries on the classes of cotton goods which we export in large quantities. The calculation is made on the basis of our total trade in cotton goods instead of on the basis of the kind of trade done with each country, since a calculation of the latter character would leave out of account the prohibitive duties on all such of our goods as were kept out of foreign markets merely by the severity of tariffs. In making this contrast I am following Memorandum xvi. of the Report of the Board of Trade with reference to British and foreign trade and industrial conditions of 1903. The figures given below are taken from that Memorandum.

STATEMENT SHOWING THE AVERAGE INCIDENCE (*AD VALOREM*) OF THE IMPORT DUTIES
LEVIED BY VARIOUS COUNTRIES ON BRITISH COTTON GOODS

8

THE COTTON INDUSTRY

	Average Value of Exports from the United Kingdom to all Countries in 1902	RUSSIA		UNITED STATES	
		Rate of Duty (Estimated Equivalent)	Approximate Equivalent Rate of Duty <i>ad valorem</i>	Rate of Duty (Estimated Equivalent)	Approximate Equivalent Rate of Duty <i>ad valorem</i>
Cotton manufactures—					
Piece goods, unbleached .	2 01 <i>d.</i> per yard	{ 4 16 <i>d.</i> per yard }	Per cent 207	1 44 <i>d.</i> per yard	Per cent 72
„ bleached .	2 46 <i>d.</i> „		169	1 81 <i>d.</i> „	74
„ printed .	2 68 <i>d.</i> „	{ 6 6 <i>d.</i> „ }	246	2 35 <i>d.</i> „	88
„ dyed, etc. .	3 46 <i>d.</i> „		191	2 35 <i>d.</i> „	68
Cotton thread for sewing .	26 89 <i>d.</i> per lb	10 55 <i>d.</i> per lb	39	100 8 <i>d.</i> per lb	375
Cotton yarn—					
Grey	10 49 <i>d.</i> „	7 39 <i>d.</i> „	70	5 <i>d.</i> „	48
Bleached or dyed . .	11 23 <i>d.</i> „	8 55 <i>d.</i> „	76	5 <i>d.</i> „	45

STATEMENT SHOWING THE AVERAGE INCIDENCE (*AD VALOREM*) OF THE IMPORT DUTIES
LEVIED BY VARIOUS COUNTRIES ON BRITISH COTTON GOODS—*continued*

	Average Value of Exports from the United Kingdom to all Countries in 1900	AUSTRIA-HUNGARY		FRANCE	
		Rate of Duty (Estimated Equivalent)	Approximate Equivalent Rate of Duty <i>ad valorem</i>	Rate of Duty (Estimated Equivalent)	Approximate Equivalent Rate of Duty <i>ad valorem</i>
Cotton manufactures—			Per cent		Per cent
Piece goods, unbleached	2 01 <i>d</i> per yard.	1 09 <i>d</i> . per yard.	54	0 99 <i>d</i> per yard	49
„ bleached	2 46 <i>d</i> . „	1 31 <i>d</i> . „	53	1 18 <i>d</i> „	48
„ printed	2 68 <i>d</i> . „	1 74 <i>d</i> „	65	1 38 <i>d</i> „	51
„ dyed, etc	3 46 <i>d</i> . „	1 63 <i>d</i> „	47	1 25 <i>d</i> „	36
Cotton thread for sewing	26 89 <i>d</i> . per lb.	3 81 <i>d</i> per lb	14	53 09 <i>d</i> per lb	197
Cotton yarn—					
Grey	10 49 <i>d</i> „	1 52 <i>d</i> . „	14	1 52 <i>d</i> . „	14
Bleached or dyed	11 23 <i>d</i> „	1 96 <i>d</i> „	17	2 29 <i>d</i> . „	20

STATEMENT SHOWING THE AVERAGE INCIDENCE (*AD VALOREM*) OF THE IMPORT DUTIES
LEVIED BY VARIOUS COUNTRIES ON BRITISH COTTON GOODS—*continued*

	Average Value of Exports from the United Kingdom to all Countries in 1902	ITALY		GERMANY	
		Rate of Duty (Estimated Equivalent)	Approximate Equivalent Rate of Duty <i>ad valorem</i>	Rate of Duty (Estimated Equivalent)	Approximate Equivalent Rate of Duty <i>ad valorem</i>
Cotton manufactures—			Per cent		Per cent
Piece goods, unbleached	2 01 <i>d.</i> per yard	68 <i>d.</i> per yard	34	0 87 <i>d.</i> per yard.	43
“ bleached	2 46 <i>d.</i> „	82 <i>d.</i> „	33	1 09 <i>d.</i> „	44
“ printed	2 68 <i>d.</i> „	1 4 <i>d.</i> „	52	1 31 <i>d.</i> „	49
“ dyed, etc.	3 46 <i>d.</i> „	99 <i>d.</i> „	29	}	38
Cotton thread for sewing	26 89 <i>d.</i> per lb	4 8 <i>d.</i> per lb	18	3 81 <i>d.</i> per lb	14
Cotton yarn—					
Grey	10 49 <i>d.</i> „	1 44 <i>d.</i> „	14	0 98 <i>d.</i> „	.9
Bleached or dyed	11 23 <i>d.</i> „	2 13 <i>d.</i> „	19	1 63 <i>d.</i> „	15

STATEMENT SHOWING THE AVERAGE INCIDENCE (*AD VALOREM*) OF THE IMPORT DUTIES
LEVIED BY VARIOUS COUNTRIES ON BRITISH COTTON GOODS—*continued*

		BELGIUM		CANADA ¹	
	Average Value of Exports from the United Kingdom to all Countries in 1902	Rate of Duty (Estimated Equivalent)	Approximate Equivalent Rate of Duty <i>ad valorem</i>	Rate of Duty (Estimated Equivalent)	Approximate Equivalent Rate of Duty <i>ad valorem</i>
Cotton manufactures—					
Piece goods, unbleached	2 01 <i>d</i> per yard.	0 56 <i>d.</i> per yard	Per cent 28	} 16½ per cent <i>ad val.</i>	Per cent 16½
bleached	2 46 <i>d</i> "	0 64 <i>d.</i> "	26		
printed	2 68 <i>d.</i> "	0 73 <i>d.</i> "	27	} 23½ "	23½
dyed, etc	3 46 <i>d</i> "	0 75 <i>d.</i> "	22		
Cotton thread for sewing	26 89 <i>d</i> per lb	8 per cent <i>ad val</i>	8	16½ "	16½
Cotton yarn—					
Grey	10 40 <i>d</i> "	0 65 <i>d.</i> per lb.	6 (?)	} 8½ "	8½
Bleached or dyed	11 23 <i>d.</i> "	0 76 <i>d</i> "	7		

¹ Preferential rates.

STATEMENT SHOWING THE AVERAGE INCIDENCE (*AD VALOREM*) OF THE IMPORT DUTIES
LEVIED BY VARIOUS COUNTRIES ON BRITISH COTTON GOODS—*continued*

	Average Value of Exports from the United Kingdom to all Countries in 1902	NEW ZEALAND		AUSTRALIAN COMMONWEALTH	
		Rate of Duty (Estimated Equivalent)	Approximate Equivalent Rate of Duty <i>ad valorem</i>	Rate of Duty (Estimated Equivalent)	Approximate Equivalent Rate of Duty <i>ad valorem</i>
Cotton manufactures—					
Piece goods, unbleached .	201 <i>d.</i> per yard	Free.	Per cent		Per cent
" printed .	2 46 <i>d.</i> "		Free		
" bleached .	2 68 <i>d.</i> "	15 per cent <i>ad val</i>	15	5 per cent <i>ad val</i>	5
" dyed, etc. .	3 46 <i>d.</i> "				
Cotton thread for sewing .	26 89 <i>d.</i> per lb	Free	Free	Free	Free
Cotton yarn—					
Grey	10 49 <i>d.</i> "	20 per cent <i>ad val</i>			
Bleached or dyed .	11 23 <i>d.</i> "		20		

STATEMENT SHOWING THE AVERAGE INCIDENCE (*AD VALOREM*) OF THE IMPORT DUTIES
LEVIED BY VARIOUS COUNTRIES ON BRITISH COTTON GOODS—*continued*

	Average Value of Exports from the United Kingdom to all Countries in 1902	SOUTH AFRICAN CUSTOMS CONVENTION ¹	
		Rate of Duty (Estimated Equivalent)	Approximate Equivalent Rate of Duty <i>ad valorem</i>
Cotton manufactures—			
Piece goods, unbleached	2 01 <i>d.</i> per yard	7½ per cent <i>ad val</i>	7½
" bleached	2 46 <i>d.</i> "		
" printed	2 68 <i>d.</i> "		
" dyed, etc.	3 46 <i>d.</i> "		
Cotton thread for sewing.	26 89 <i>d.</i> per lb		
Cotton yarn —			
Grey	10 49 <i>d.</i> "		
Bleached or dyed . .	11 23 <i>d.</i> "		

¹ Preferential rates.

That British exports of cotton goods are much less than they would be but for the restrictive measures taken by other countries, goes without saying. We may hope, however, that as the industrialism of other nations develops there will be less inclination upon their part to protect their industries. With a growing capacity to hold their own in the manufactures that are now being fostered, there will be increased willingness to face foreign competition, and if the result is not more trade, at least it will be more international specialism.

The writer who attempts to explain the changes in foreign trade, and to draw arguments from the relative industrial efficiencies of different countries, is beset with a multiplicity of errors. We must, therefore, I think, at this stage of our journey, pause to remind ourselves of the conditions governing the lines of foreign trade. If an alteration occurs in the world's system of exports and imports, we are inclined to look only at the industry chiefly affected in the expectation of discovering the reason. But the reason is quite as likely to lie with other industries, or even to be unconnected with industrial advance or decline, and be attributable to foreign loans, say, or repayments of loans. The relative improvement of certain of our industries other than the cotton industry might very well be reflected chiefly in a diminution of our cotton exports, though the gap between our real costs of production and the costs of production abroad might be as wide as ever, or even wider. For it is the ratio of the costs of production (including costs of carriage to the consumers) of different commodities in a country in relation to similar ratios in the countries with which it trades, that lays open the various lines of international trade, and not, as might be supposed, the

different absolute costs of production (were they discoverable) of the same article in different countries, that is in so far as the trade is not a temporary one which is swept away by international movements of bullion. Again, the extent to which a trade is carried on is governed by the relations between the reactions of different amounts of output on cost of production in the various industries, and on intensity of demand, in the countries affected. Exports cannot be so considerable, other things being equal, when the goods exported are subject to diminishing returns as when subject to increasing returns. Diminishing returns are said to operate when increased quantities of a commodity are only produced at an increased cost per unit at the margin, even in the long run when the industry has settled down to the greater output. "Increasing returns" has a corresponding meaning. Let us take a simple example. If England contributed regularly over a number of years to foreign loans, her exports would be proportionately increased. The casual thinker might suppose that the increase would, in the long run, be felt pretty equally all round by her industries, a little meditation, however, makes it apparent that it would not, but that those industries would be encouraged most in which the cost of production was on the whole lowered most, and of which the products were demanded with the least diminution in intensity on the whole when their volume was increased. In the fictitious case imagined above our supposition that the loans continued over some years was made in order to allow time for the industries to settle down to the additional pressure put upon them. It is obvious from the foregoing that problems of international trade are most complex, and that much

information as to facts, as well as keen analysis, is required for the correct solution of actual ones. The considerations here advanced must be carefully borne in mind when the parts of this book dealing with changes in foreign trade, the growth of the industry abroad, and relative efficiencies in production are being read

There is one question that must have occurred to many people engaged in the cotton industry which might profitably be examined shortly here, though it is indirectly dealt with above. The question relates to increasing returns, which has already been explained, and the location of industries. How comes it, we can imagine it being asked, that an industry subject to increasing returns is not the monopoly of one country only? If the more a country makes of a given thing the less is the marginal cost of making the thing per unit, it would seem that the country which obtained a lead in the manufacture in question would ultimately oust all rivals. How could the Continent and the East ever have started in competition with the centralised industry of Lancashire? Could they have started without protection? The solution of the difficulty is as follows. In the first place many of the economies causing the increasing returns may be shared by the newest and smallest industries. This point will be made clear by an illustration given by the writer elsewhere —

“Supposing that Bulgaria begins to compete with Lancashire in the cotton industry, as she has recently done, it is not necessary for the Bulgarians to perform all the processes of cotton manufacture, from cleaning the cotton, and spinning all the sorts of warps and wefts required, to making up and finishing the fabric. They are not, therefore, compelled to work uneconomically

with no specialisation to speak of. Naturally the Bulgarians would start producing a narrow range of counts that are easily spun. For these counts there would be, we may suppose, a large home market at a price, some of which they would try to satisfy. My point is that they could begin with intense specialisation because of the extent of the market already created by foreign enterprise. Nor need the Bulgarians either use rough machinery constructed by village smiths, until their mills be sufficient in number to afford a market for specialised machines, or begin spinning at once on a gigantic scale, for machinery can be imported, and, therefore, approximately as great a degree of mill-specialisation could be attained with one mill as with one hundred mills. Certain continental mills, indeed, might share in the advantages accruing from the developed Liverpool cotton market, but many, of course, would be prevented from doing so by the cost of transport and the obstacles in the way of frequent deliveries."¹

In the second place there is the cost of carriage from the factory to the consumer to be taken into account—a less efficient industry might be able to supply contiguous consumers cheaper than could a more efficient industry in a distant country. In the third place there are the other industries and their earnings to be reckoned with. To imagine an example, England, in consequence of her local economies, might, other things being equal, be able to make all the cotton goods that Portugal wanted cheaper than she, Portugal, could make them for herself, but to do so England might have to give up manufacturing goods in the production of which, in view

¹ *Economic Journal*, June, 1905. The question that we are briefly dealing with above is fully examined in the article quoted.

of the demand for them, her relative advantages were even more pronounced. This argument, it will be noticed, is of some application to the effects of trusts. Trusts, some have thought, should they cheapen production, will be most menacing to the industries of other countries. If this be so, we may reply, the experience of Lancashire ought not to be what it is to-day.

NOTES ON THE DIAGRAM

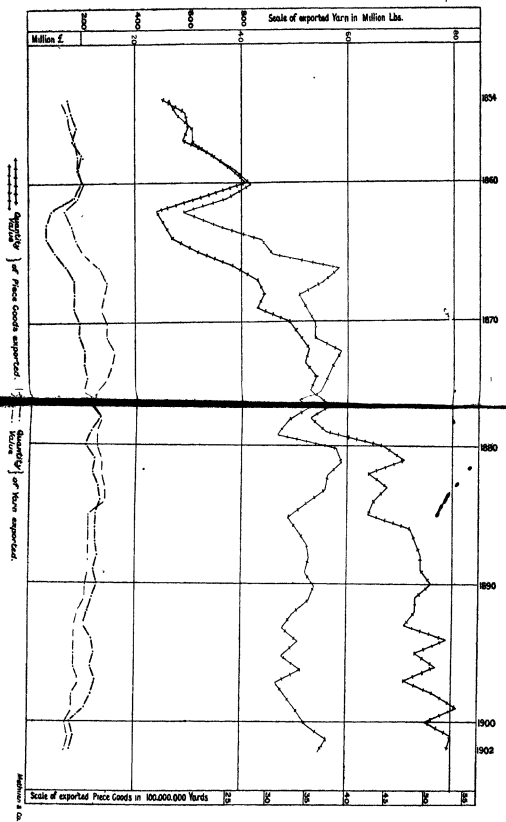
The diagram must be read with caution. First, as regards values, it must be remembered that the purchasing power of money has not remained constant. If we mean by the value of a thing the number of things in general that it would exchange for, then we must reduce the "values" in this diagram by index-numbers giving the general purchasing power of money. Sauerbeck's index-numbers, based upon the wholesale prices of a group of commodities, for the years covered by the diagram, are as follows —

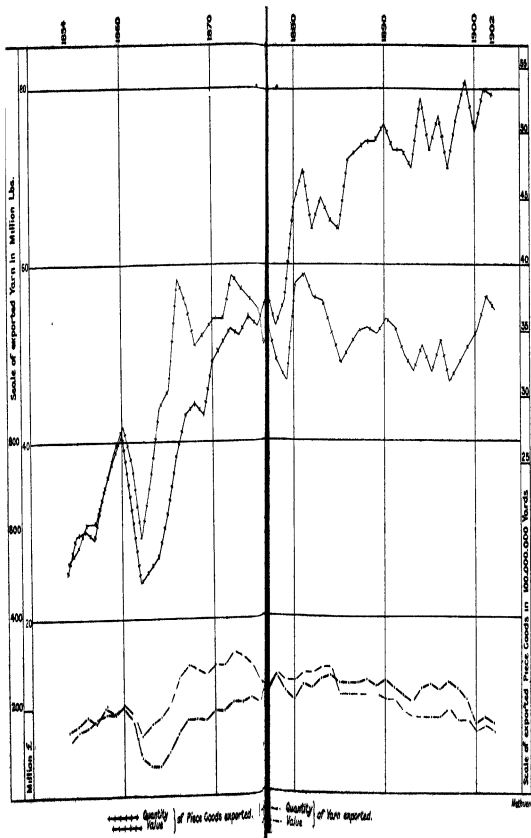
1854 . 102	1867 . 100	1879 . 83	1891 . 72
1855 . 101	1868 . 99	1880 . 88	1892 . 68
1856 . 101	1869 . 98	1881 . 85	1893 . 68
1857 . 105	1870 . 96	1882 . 84	1894 . 63
1858 . 91	1871 . 100	1883 . 82	1895 . 62
1859 . 94	1872 . 109	1884 . 76	1896 . 61
1860 . 99	1873 . 111	1885 . 72	1897 . 62
1861 . 98	1874 . 102	1886 . 69	1898 . 64
1862 . 101	1875 . 96	1887 . 68	1899 . 68
1863 . 103	1876 . 95	1888 . 70	1900 . 75
1864 . 105	1877 . 94	1889 . 72	1901 . 70
1865 . 101	1878 . 87	1890 . 72	1902 . 69
1866 . 102			

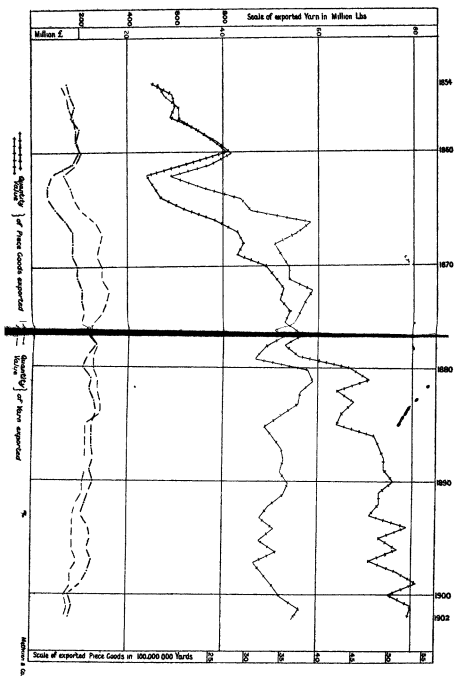
A fall in the index-numbers means a rise in the general purchasing power of money. We may give one example to show how to use the index-numbers. The value of the exports of yarn in 1854 and 1902 were £6·5 millions and £7·5 millions respectively, according to the diagram. To reduce the latter value to value at the purchasing power of money in 1854, we must multiply by the index-number for 1854, and divide by the index-number for 1902; thus, £7·5 millions $\times \frac{102}{70} = \text{£}11$ millions (approximately).

But, of course, it will be remembered that things in general











have been getting cheaper, as measured by "producing power," if this abstract conception be permitted

As regards quantities the following points must be noted —

1 Piece goods are given in length, and yarns in weight, and the two groups of figures are, therefore, incomparable, even relatively, since the fineness of our exports has altered considerably

2 Our exports of yarns are much finer than they used to be.

3 Our exports of fabrics are finer on the whole than they used to be, and (according to the detailed figures published since 1889) the proportion of the more expensive goods to the cheaper goods in our exports has been increasing

Prior to 1884 large quantities of piece goods of mixed materials, in which wool predominated, were erroneously entered as cotton manufactures. They swell the figures represented in the diagram, but they did not ordinarily exceed £600,000 in value or 20 million yards in quantity

As regards the extent of trade shown by the diagram it must be borne in mind that it does not cover the whole of our export trade. The exports given do not include sewing thread, hosiery, lace, and unenumerated cotton goods. The exports of sewing thread have increased largely in value and quantity: their annual value on an average was £3,800,000 in the period 1899-1903. The annual value on an average of the total hosiery, lace and patent net, and unenumerated cotton goods exported in the same period was about £6,000,000. Our imports of cotton goods—which are coloured and fancy goods almost entirely—have greatly expanded in value: they stood on an average in the period 1899-1903 at nearly £5,400,000 annually

CHAPTER V

EUROPE

AT the end of this book a table will be found of the spindles, looms, and trade, of all those countries the magnitude of whose cotton industry is appreciable. These figures must be used with caution. In the first place, in many cases they are rough estimates, or figures collected in such a way as to be only rough approximations; and in the second place different conditions in different countries render such statistics as seem to measure the relative magnitude of the industry in various places untrustworthy indices. The trade figures, for example, are subject to the numerous errors to which attention has been called by the British Association Committee to investigate the accuracy and comparability of British and Foreign Statistics of International Trade. Again, the quantity and value of the output from a mill depend upon the rate of spinning and fineness of the yarn produced: of two countries with the same number of spindles one might turn out more yarn but less value than the other. The productive power of machinery depends upon the speed with which it is run. In the case of spinning, we may remark in passing, its speed is governed chiefly

by the fineness of the yarn being produced, the quality of the cotton used, and the efficiency of labour.

The past seventy years have witnessed great changes in the comparative positions of the United Kingdom, the continent of Europe, and the United States, in respect of the production of cotton goods. The cotton industry established itself in England in the midst of favourable climatic and economic surroundings, and comparatively peaceful conditions prevailed in the British Isles at the time when the epoch-making events which constitute the Industrial Revolution were taking place. Abroad, economic enterprise at this period was checked for a long period by social upheavals, political reconstructions, wars and rumours of wars. It is true that the revolution in economic arrangements was not brought about in England without violent and organised opposition on the part of many of those who suffered, or thought they would suffer, from the change, or were wedded to old customs and hated the idea of a new order of things, but such opposition, harassing as it proved (though a little salutary), was slight in comparison with the turmoil wherein the lot of most peoples of the European mainland was cast. England having accommodated herself to the new conditions—the factory, steam, machinery, and large-scale industrialism—it was found that contiguous countries lay far behind in economic efficiency. Then England approached the ideal of questionable attractiveness of being the workshop of the world.

America, too, was far behind England in economic development. In America at the time much pioneering work still remained to be done; agriculture was the chief industry, and the concentration of population was

not such as to foster the appearance of industrialism of the English type. Though living in peace at home, our relatives beyond the Atlantic were not in a position to emulate British example. In a work written by a James Montgomery in 1840, it was asserted that our cost of production of yarns was about 19 per cent. less than that of the United States; cost of carriage, however, of our raw material and of our products across the Atlantic neutralised much of our advantage.

We should be prepared, therefore, for the violent contrast which the figures for to-day and seventy years ago reveal with regard to the cotton industry in different parts of the civilised world.

AVERAGE ANNUAL CONSUMPTION OF COTTON IN
THE PERIOD 1831-5.

	Millions of lbs
United Kingdom	295
Continent of Europe	143
United States	79

AVERAGE ANNUAL CONSUMPTION OF COTTON IN
THE YEAR ENDING SEPTEMBER 30TH, 1902¹

	Millions of lbs.
United Kingdom	1,627
Continent of Europe	2,392
United States	2,018

Taking British consumption in each period as 100, in the first period the consumption of the Continent was 48.3 and that of the United States 26.6, whereas in the second period these figures had become 147 and 124 respectively.

¹ These figures are quoted from Mr. Helm's essay on *British Industries*, edited by Professor Ashley.

Other countries have been advancing upon us and closing the immense gap which existed at the close of the first third of the nineteenth century, but, it should be noted, it is upon the finest work that Lancashire retains its hold most tenaciously. Fine spinning is prosecuted here with a success which is unrivalled in any part of the world. This could be guessed from the numbers of spindles taken in conjunction with the consumption of cotton, though, of course, as it has been remarked, the consumption of cotton is dependent also upon the speed at which machinery is worked. Taking the spindles of the three areas to-day as 47,000,000 for the United Kingdom (which is a lower figure than is usually given), 34,000,000 for the Continent, and 21,500,000 for the United States, we arrive at the following consumptions of cotton per spindle :—

	lbs
United Kingdom	34 6
Continent of Europe	70 3
United States	93 9

Second to England in respect of the magnitude of the cotton industry stands the great republic of the New World; but the cotton industry in the United States we shall examine in a chapter apart, since recent developments have rendered it of peculiar interest.

GERMANY

As in many other branches of industry—for instance, the iron and steel industries—the German Empire takes the third place of the chief nations of the world in producing cotton goods. The manufacture in its factory form was first established in Saxony. In the year 1782 the first three spinning mules were set up, and

shortly after the new machines were applied in the Rhineland. With the aid of protection, the spinning industry on the Rhine and in Westphalia and Saxony expanded considerably.

The Customs Union between Saxony and South Germany infused new life into the cotton industry. Numerous joint-stock companies were established, and in 1835-6 large spinning-mills and weaving-sheds appeared in Chemnitz, Scharfenstein, Esslingen, Lorrach, Urach, Augsburg, and other places. "Saxony's hosiery," declared a report of the "seventies," "Elberfeld's coloured goods, Barmen's ribbons and trimmings, Gladbach's clothing fabrics, and Ettlingen's general cotton goods, enjoy a world-wide reputation. German calico manufactures reach ever-widening markets. All foreign demand used to be monopolised by the English and French; in prints and coloured goods now, however, Germany, by reason of the industry in Alsace, stands in the front line."¹

The consumption of cotton by German spindles affords some indication of German progress, though changes must have taken place in the average fineness of the yarns produced. Germany's consumption of cotton has been as follows in metric tons :—

			Tons of Cotton per annum.
1836-40	.	.	9,000
1856-60	.	.	46,000
1876-80	.	.	124,000
1886-90	.	.	201,000
1899	.	.	313,000

¹ For this sketch of the development of the cotton industry in Germany I am indebted to Oppel's *Die Baumwolle*. Some useful facts about the German industry will be found in Schulze-Gaevernitz's *Cotton Industry*, from which I shall draw extensively for an account of its general character, and also in Huber's *Deutschland als Industriestaat*.

Much of the increase shown in the third period, however, it must be observed, was due to the inclusion of Alsacè and Lorraine after the Franco-Prussian War. In 1895 Alsace alone possessed about 1,500,000 spindles and some 38,000 looms.

It is of interest to contrast these figures with others relating to the growth of businesses with a view to acquiring some notion of the rate at which the typical magnitude of the factory has advanced. In spite of the increase, which reaches nearly 70 per cent., in the imports of cotton wool into Germany between the early "eighties" and the early "nineties," we find the number of spinning mills in the same period actually reduced from 6,750 to 2,450, and the number of weaving-sheds declining from 56,200 to 32,750. At the same time also the factories turning out mixed goods fell in numbers from 25,200 to below 16,350. The figures as to the persons of each sex employed in the various cotton factories of Germany in the year 1895 are as stated beneath :—¹

	Factories	Total No of Persons employed.	No of Women
Spinning	1,990	74,810	40,420
„ of Vicoigne	105	8,235	5,420
Weaving	29,000	147,120	72,120
Dyeing and bleaching cotton	1,110	32,620	8,225
Total	32,205	262,785	126,185
Manufacture of cotton lace, trimmings, etc. (approximately)	20,170	156,885	94,320

¹ See Oppel's *Die Baumwolle*, p. 661.

In addition to these statistics, Oppel in his useful work quotes others to show the present location of the German spinning industry. These may with advantage be repeated here. The four chief States in which the spinning industry is to be found are :—

Prussia,	with	2,021,800	spindles
Saxony	„	1,869,900	„
Alsace	„	1,597,800	„
Bavaria	„	1,390,600	„

Wurtemberg stands next, but contains less than 550,000 spindles

Only seventeen places in Germany contain as many as 100,000 spindles. These places are —

Mulhausen	471,000
Augsburg	372,500
Gronau	274,000
Werdau	248,500
Rheydt	247,900
Munchen Gladbach	215,700
Rheine	198,400
Hof	196,300
Chemnitz	195,200
Gebweiler	187,400
Leipzig	182,000
Crimmitschau	168,300
Logelbach	140,500
Bocholt	128,400
Bamberg	125,000
Bayreuth	100,000

It is apparent that the geographical concentration of the industry in Germany is far less than in the British Isles. This is one of the causes for German specialism

being less intense than ours and for the higher cost of production in Germany. Yet it would be an error to suppose that no kind of localisation is to be found in Germany. Three considerable districts are broadly distinguishable:—

(1) The south-west, which stands in close contact with the cotton districts of East France, Switzerland, and Vorarlberg, and contains $3\frac{1}{2}$ million spindles unequally distributed between Alsace, Baden, Wurtemberg, and Bavarian Swabia.

(2) The middle district, wherein are $2\frac{1}{2}$ million spindles, and which lies about the country north of the mountain ranges of Northern Bohemia. In this territory the oldest industry is that of Saxony, which stretches back some four hundred years.

(3) The north-west district (the Rhine Province and Westphalia), with about $1\frac{3}{4}$ million spindles.

The German industry is much less developed than that of England. The specialisation of businesses as well as of districts has not been carried to the same extent. On the whole the spinning is coarser, and there are no places in Germany which possess the climatic advantages of Lancashire. As in spinning, so in manufacturing, Germany on the whole is far less advanced than England. Numerous hand-loom still survive in certain parts of Germany, though in the last few years the rate of their disappearance has been greatly accelerated.

For some years cotton markets for raw cotton have existed at Havre and Bremen. These markets receive their cotton direct from the producing country. But the Continent is behind England in its cotton markets as well as in the industry; the markets of Bremen and

Havre are neither so large nor so highly organised as the market at Liverpool. "Futures" are used at Havre, but so far they have not established themselves in the market at Bremen

To contrast the industrial efficiencies of countries by means of statistics is no simple task, for some of the figures that are wanted are not easily procurable, if they are procurable at all; others are estimates only, and many have been collected on untrustworthy methods. Moreover figures, even if true to fact, may easily lead to erroneous conclusions. Thus sets of figures giving the proportion of operatives to machinery may be indices of comparative industrial efficiencies, or they may point merely to the different policies which prevail among employers as to the proportions in which capital should be expended on machinery and labour. Nevertheless from statistics quantitative judgments may be safely formed if many groups of figures representing different facts all point to the same conclusion, or if with the figures we are able to combine the opinion of some authority well acquainted with the facts. Such an authority is to be found in Dr Schulze-Gaevernitz, Professor of Political Economy at Freiburg, who undertook a comparison of the cotton industry in England, Germany, and France, a little more than a dozen years ago. From his investigations we may quote two tables which show more clearly than many words could picture it the relative position held by England at the time when Dr. Schulze-Gaevernitz wrote. It must be added further that in putting forward these tables Dr. Schulze-Gaevernitz made no mention of differences in industrial arrangements to be held in mind by those interpreting them, as we may suppose so careful a social investigator would have done had there

been any necessity. In the first table a comparison is drawn between a typical Oldham mill and one in Mulhouse. The table is as follows:—

	OLDHAM	MULHOUSE
Number of spindles in mill	70,000	32,000
Hands employed mixing	2 men	2 3 men
„ „ loosening threads	4 men and women	7 6 men and women
„ „ carding	7 men	15 5 men
„ „ drawing	7 women.	12 6 women
„ „ slubbing and roving	43 women and children	44 3 women and girls
„ „ spinning	95 men and boys.	87 men and boys.
„ „ as overseers	3	4
„ „ as packers	6	12
Total hands	167	185 3
Percentage per 1,000 spindles	2 4	5 8

In both cases self-actors only are considered. The counts in the case of Oldham were 36's to 40's, but those for Mulhouse 20's, French (metrical), "but this circumstance," says our authority, "does not come into account in the extraordinarily high difference" in respect of the efficiency of labour.

The second table presents an equally unmistakable contrast (see pages 112 and 113).

Again, the state of affairs as between Oldham and Switzerland has been pictured for us in certain figures taken as examples:—

40's twist.	Oldham.	Switzerland
No. of operatives per 1,000 spindles	2 3 . .	6 2
Thereof for preparation	0 31 .	1 7
„ slubbing, roving, and intermediate	0 62 .	1 2
„ spinning proper	1 37 .	3 3

PARTICULARS RESPECTI

(From Schulze-Gaevern)

	Places	No of Spindles per Pair of Self-actors	No of Operatives		Length Traver
			Spinners	Helpers	
(1) 12's metric warp .	Vosges .	1,272	2	3	Metre 1 6
" " . .	Mulhouse .	1,280	1	3	1 5'
(2) 28's metric warp .	Vosges . .	1,272	2	2	1 6
" " . .	Mulhouse .	1,280	1	3	1 5'
(3) 20's twist English .	Bavaria .	1,568	1	3	Inche 64
" " .	Wurtemberg .	1,200	1	4	65
" " .	Saxony	2,000	1	4	68
" " .	Oldham . .	2,208	1	2	66
(4) 30's twist English	South Germany	1,472	1	3	63
" " . .	Bolton . .	2,064	1	2	64
(5) 36's twist English	South Germany	1,472	1	3	63
" " . .	Switzerland .	1,200	1	2	62
" " . .	Saxony . .	{ 1,704	1	3	61
		{ 2,000	1	3	62
" " . .	Oldham . .	{ 2,376	1	2	67
		{ 2,688	1	3	67
(6) 40's twist English .	Oldham . .	{ 1,560	1	2	65
		{ 2,400	1	2	64
(7) 60's twist English .	Alsace .	1,248	1	2	60
" " . .	Bolton . .	1,632	1	2	61
(8) 120's weft English .	Alsace . .	1,764	1	3	6
" " . .	Bolton . .	2,280	1	3	5'

SPINNING BY SELF-ACTORS

(on Industry, p 103.)

Years for reverse calculations and rewards	Weekly Working Hours	Weekly Production per pair of Self-Actors	Spinning Prices	Weekly Earnings of Spinners	Average Weekly Wages of Helpers	No of Spindles per Overlooker	Weekly Earnings of Overlooker
		Kilos	Pfennige Per Kilo	Marks	Marks		Marks
13	66	1,900	3 9	21	10 80	10,000 to 20,000	35 to
12 5	66	2,050	3 15	24	13 50	"	"
15	66	900	8 89	21	10 80	"	"
14	66	740	7 02	24	13 50	"	"
15	65	lbs 2,420	per lb 1 9	18	10 70	15,000	27
15	65	1,900	2 6	21	10 50	"	"
14	64	3,600	1 7	22	11	10,000	35
13	55	3,432 5	1 8	45	15 25	—	—
16	66	1,340	3 37	21	7 70	15,000	20 to
14 6	55	2,200	3 25	46	12 75	—	—
19	65	1,095 5	4	21	7 70	15,000	20 to
17	65	850	3 9	18	7 50	11,400	21 to
15	65	1,550	3 35	21	8 to 13	5,000	20 to
14	64	1,800	3 2	22	9 to 13	10,000	31
13	55	2,182	3 25	38	17 75	—	—
13	55	2,723 6	2 88	40 15	12 9	—	—
13	55	1,222	Pence 0 6	s d 33 5	s d 14 2½	—	—
13	55	1,650	0 5	36 0	16 2	—	—
22	69	530	Pfennige 9 75	Marks 21	Marks 12 50	12,000 to 15,000	28 to
17 7	55	633 3	9 75	40	11	—	—
28	69	258	22 75	21 60	10 33	8,000	28 to
21	55	333 3	22 28	43	11	—	—

Dr. Schulze-Gaevernitz expresses his conclusions as to efficiency in the cotton industry in England and in Germany in the following words :—

“The self-actors in both countries are certainly on exactly the same principles, indeed, those in Germany have in many cases been made in England. Whilst in England about 2,000 spindles per pair of self-actors is to be looked upon as the usual number, about 1,300 to 1,600, with a great variation in some cases, are to be taken in Germany as the mean, 1,300 to 1,800 are given as the average in Mulhouse. In Germany this number of spindles is generally tended by more operatives than the greater number of spindles on the English machines. In Mulhouse 1,300 spindles require one spinner and four helpers (two piecers, two fillers); in England 2,000 spindles require only one spinner and two helpers; 2,000 spindles in one of the finest spinning concerns of Saxony require one spinner and four helpers, whereas in the smaller spinning mills of Saxony one spinner and five helpers are needed for a pair of self-actors with only 1,600 spindles”

Dr. Schulze-Gaevernitz feels no doubt as to the superior efficiency of the English industry—indeed, more than once he declares with some exaggeration that the German industry is in the position of England's in the “thirties.” True, more than a dozen years have passed since the comparison from which we are quoting was instituted, and there is no doubt that in those years Germany has diminished the gap which separates her industry from ours in respect of economies in production, but the gap still remains, and could not easily escape the notice even of a casual and inexpert investigator. The following passage is extracted from a report made in 1901 by an American consul in Germany :—

"The task of educating labour up to a high degree of efficiency is difficult, and many generations are necessary to achieve that result. The English cotton spinners have attained such a degree of skill and intelligence that, for the most part, no supervision is necessary. In Germany the presence of a technical overseer is indispensable. Another advantage which England enjoys is the cheap price of machinery. Germany imports the major part of her machinery from England, and German wholesale dealers in these machines have not been able, by placing large orders, to overcome the difference caused by freight and tariff."

Let us now turn to the question of manufacturing. In England the proportion of looms to operatives, the number of operatives being written as 100, and all operatives being included, both those working on preparatory machinery as well as weavers and their helpers, was 90, 160, 210, and 460 in 1820, 1850, 1878, and 1893 respectively; in Alsace it stood in 1890 at about 150; in India, we may notice, it was as low as 20. English looms, we are informed, ran then about 30 per cent. faster than the German looms on the whole, and lost 10 per cent. less time. Under these conditions our product per loom was greater, though the hours of labour in England were about 16 per cent. less than those of Germany. The speed of looms on plain goods in England, roughly averaged, was from 80 to 90 picks a minute in 1830, according to Ure; to-day it must be about 200, though of course a much higher rate is frequently attained. In Alsace, in 1882, according to Jannasch's *Europäische Baumwollindustrie*, as quoted by Schulze-Gaevernitz, it stood at about 140 picks per minute. The approximate speed of looms on plain cotton goods was somewhat

thus, according to Schulze-Gaevernitz, when he made his calculations—

PICKS PER MINUTE			
Width.	England.	Switzerland	Alsace
80-85	240	190-200	150-160
110-115	200	160-170	130-140
135-140	180	150-160	120-125
165-170	180	120-130	110-115

Of some of the chief causes for the state of affairs sketched above, an excellent analysis has been made by the investigator from whose results we have selected typical examples:—

“Whilst in England the spinner and weaver in many cases only produce one or two specialities, the German employer has hundreds of patterns. Therefore he is compelled frequently to alter his machines and to accustom his workmen to new work, which not only means less total production and more working costs, but also greater wear and tear. Add to this that in Germany the combining of spinning with weaving in the same business—clearly only because the difficulties of selling occur in this case but once—pays the best, exactly as reported by the English Commission in the thirties, to-day, however, the organisation of the market in England makes possible that technical separation between weaving and spinning which is preferable. . . .”

“But especially disadvantageous is the decentralisation in respect to the sale. Here also the German manufacturer stands under the same disadvantages with which the English had to struggle in the thirties. The German manufacturer still seeks his customers through travellers and agents, and in many instances through retail sellers, whose financial standing is often question-

able, whose necessity for credit is always certain. Hence the complaints about the bad conditions of payment in Germany which crop up continually in the *enquête*. The manufacturers had to wait three, four, or six months and even twelve months and longer for payment. In reality there existed 'termless terms'—a 'complete anarchy in the method of payment.' Sir Walter Raleigh once similarly complained to the English that the economical greatness of the Dutch was founded on the system of cash payments. The disadvantages pictured are only to be avoided by progressive division of labour. The manufacturer cannot be at the same time commission agent, banker, merchant, and retail dealer, he needs sound customers capable of paying. He fares best if the sale is concentrated in one market, and 'change' prices simplify the struggle between buyer and seller. The search for customers, foreign as well as home, and the bearing of all possible risks of disposal, are in any case difficult enough to necessitate the whole strength of a man. The wholesale merchant alone is in a position to pay the manufacturer in cash or on sure, short terms. But especially where export is in question is the dispersal of sales an extreme impediment. The manufacturer cannot follow the fashions in Australia and South America; the foreign buyer cannot travel from mill to mill."

This passage should be read in conjunction with the account given in chapter iii. of industrial and commercial organisation in England. So far as one functionary finances another here, it is rather the dealer who lends aid to the manufacturer than *vice versa*. Many large dealers to-day, who are men of capital, assist with credit small manufacturers. This has been a custom for many years. Ellison, in his well-known account of the cotton

trade, declared that the cotton dealers of Manchester, who were ultimately squeezed out of the Lancashire system, as dealers, on the Manchester and Liverpool railway proving a success, used to support many of the spinners with their capital. Much spinning also was then done on commission, yarn agents being the real undertakers. Export houses and home traders performed the same service for manufacturers, and in the early days of the factory system it was in consequence made a complaint that over-production was caused by persons being able to get started as manufacturers without any capital to speak of.¹ The distribution of credit in these early days was traditionally connected with the system which had preceded it when the factory was less usual. It was necessitated by the changes of the times as a temporary expedient at least. There was a tremendous demand for cotton goods which could only be met by practical men enlarging their operations. Of these there were many, though few had means. On the other hand, capital was increasing in mobility under a new enterprise, and the economic change that awakens daring, and credit systems were soon devised to enable it to lend its support to the "producers." The distribution of risk in those days, however, was not always the best imaginable, and manufacturers were frequently brought to ruin through errors in dealing not their own, or sometimes it was alleged through the sharp practices of capitalist dealers who, though finding money, did not always engage that the goods produced should find a market.² A slow but steadily working evolution has since brought about a survival of the fittest credit

¹ See the author's *Lancashire Cotton Industry*, p. 25.

² *Ibid.*, p. 136

agencies and the concentration of risks upon the functionaries most capable of bearing them, and, though perfection is not yet attained and the ground of existing arrangements is frequently misunderstood, commercial organisation to-day in the Lancashire cotton trade exhibits in a remarkable degree the systematic arrangement of various kinds of specialisation which is best adapted to the needs of the industry and of the public.

Nowhere in Germany are better results achieved than in Mulhausen or Mulhouse. It lies in Alsace, and has been called the Manchester of Germany—but it is a tiny Manchester with its 80,000 inhabitants only. And in climate and appearance it is very different from the great Manchester that we know best. Its white houses, with their green shutters and the really green trees and patches of grass about the town, give it the appearance more of a pleasure resort than of an important manufacturing town. In climate, again, the contrast between our Manchester and that of Alsace is extreme. There the Vosges lie away to the west, but no damp sea breezes pass over the district for them to tap. Bright blue skies, sunny days, and a dry atmosphere are characteristic of Mulhausen. Manufacturers there would give much for the rains and soaking mists which make the fortunes of Lancashire. Indeed, Mulhausen suffers greatly from its climate, which will always prevent it from competing closely with Lancashire's fine products. Humidifiers do not appear to be capable of producing the same results as Lancashire "spinning weather" or of producing them at a reasonable cost.

In Alsace the hours allowed by law are $11\frac{1}{2}$ for five days in the week and from six a.m. to five p.m.

on the Saturday, and these hours are supposed by some to be too long for the most economical results to be attained, the admitted inferiority of Alsatian labour notwithstanding. It is a point of some importance that the more skilled labour becomes, the shorter are the hours which bring about continuously the maximum product, or most valuable product, because the more skilled the labour, the greater is the need for the maintenance of a high level of freshness.

Some of the mills in Alsace are planted out in the country and perhaps I may venture to describe here the conditions of labour at one of these rural mills which is placed some three or four miles from Mulhausen. The operatives live in a pretty little group of houses close to their work. From the roof of the larger mill there can be seen patches of peasants' land stretching away in all directions, in the distance the chimneys of Mulhausen, and about half a mile away a small village with a church. The hands in these mills are drawn almost entirely from the peasant class. One or more members of the family work in the mill, and the family continues to cultivate its patch of land. Their wages from the mill are much less than those earned in Lancashire, their standard of living is lower, and perhaps in consequence they live slower and work slower. But their life is passed in healthy and pleasant surroundings. The sight of this colony—the mills, the gardens and fruit trees, and tiny fields of roots, corn and maize—made one think of garden cities as an ideal by no means unrealisable under many circumstances. That Lancashire cannot be made like Alsace is obvious, but it is equally obvious that the conditions of life in Lancashire can be rendered brighter. There is, however, another side to

the shield we must remember. In respect of intellectual environment and opportunities the advantage is all on the side of the Lancashire operatives. The Lancashire operatives are more a conscious part of an active state, shaping its life and feeling its vicissitudes, than the operatives of Alsace—

“ Better fifty years of Europe
Than a cycle of Cathay ”

The right reform is seldom a simple step backwards. Every advance involves almost invariably changes of fundamental value. The task of the reformer is to remove their undesirable accompaniments without sacrificing real progress or checking growth.

The most valuable exports of Germany in order of value are (1) coloured goods, (2) hosiery, (3) lace and embroidery, (4) yarns, and (5) trimmings, etc. These amounted respectively in 1900 to 4,000, 3,550, 2,250, 1,450, and 1,100 pounds sterling. Germany's chief imports of manufactured goods are yarns, their value in 1900 was 3,150 pounds. The destination of the exports in 1900 is shown beneath —

TO EUROPE

	Million £s		Million £s
Great Britain	3 2	Turkey	2
Austria-Hungary	1 4	Denmark	2
Netherlands	1 2	Sweden	1
Russia	7	Italy	09
Switzerland	6	Norway	07
France	5	Roumania	06
Belgium	4		—
		Total to Europe	8 72

TO THE AMERICAS

	Million £s		Million £s
The United States	2 1	Uruguay	09
Chili	3	Venezuela	05
Argentina	3	Bolivia	04
Brazil	2	Cuba and Porto Rico	03
Peru	1	British North America	03
Mexico	09	Ecuador	02

Total to the Americas 3 45

To Asia, 57, Australia, 158, Africa, 167 million £s

TO THE VARIOUS CONTINENTS

	Million £s	Percentage of total
Europe	8 6	67
America	3 4	27
Asia	6	4
Australia	2	1
Africa	1	1

The enormous proportion sent to this country is significant. Our share consists chiefly of fancy and coloured goods, hosiery, lace, and trimmings. In the same year, that is in 1900, we sent to Germany nearly 4 million pounds' worth of cotton and cotton goods.

The total of Germany's imports and exports for different periods will be found in the table at the end of the book side by side with the trade of other countries.

It now remains to examine briefly the condition of the industry in other European countries where it has attained any magnitude. Figures as to the spindles and looms in each country of any importance, and as to trade at different times, will be found at the end of the book. The sketch that follows is largely derived from

Oppel's useful compilation entitled *Die Baumwolle*, to which I have already made some allusion. In the majority of cases I have not verified Oppel's statements, but from the instances in which I have done so I should judge that they contain few errors, and of such as there may be none that are serious.

FRANCE

France was the first continental country to make use of the English discoveries for the production of cottons, and it is therefore in no degree astonishing that up to 1870 she held a place in this industry second only to that of England. Her position, however, was altered for the worse by the loss of Alsace, in which a considerable proportion of the cotton industry was placed. To-day in France 5·5 million spindles work up some 440·8 million pounds of raw cotton, and yarns are dealt with on about 100,000 power-looms and 40,000 hand-looms.

French trade in yarns from the middle "fifties" showed an almost steadily increasing excess of imports in value, until in late years a contraction of the excess was aimed at by tariff regulations. As regards manufacturing, already in 1827-36 the average excess of exports of fabrics stood at more than 2·2 million £s. In the next ten years the average had passed 3·9 million £s. Oscillation followed, but the excess in general showed a downward tendency; in 1875-8, indeed, the imports even passed the exports. The next years, however, witnessed a complete reversal of the downward movement. After 1886, largely as a result of tariff legislation aimed at discouraging imports, the excess of exports moved rapidly upwards. Yarns are obtained chiefly from Great Britain, and fabrics from

Germany, Great Britain, and Switzerland. French exports proceed chiefly to Algeria, Madagascar, and the French possessions in Asia. In 1900 the quantities of fabrics sent to the various markets were —

	Million lbs.
To Algeria	21 6
„ Madagascar	9 6
„ Indo-China	5 6
„ Senegal	3 9
„ Other lands	6 7

Normandy, the north and the east, are the chief seats of the cotton industry. Of the Normandy district, Rouen is the most important place. Here in 1890 were two million spindles and 18,000 power-looms. In addition Darnétat, Maromme, Sotteville, Havre, Yvetot, Dieppe, Evreux, Gisors, Falaise, and Flers are noteworthy places. In the north, with its spindles that must number now two millions, and 2,000 looms in 1890, Lille, Tourcoing, Roubaix, St. Quentin, Amiens, and Hellemmes, stand in the first rank. The east possesses 1,300,000 spindles and about 40,000 looms, the department of the Vosges alone has nearly a million spindles and some 28,000 looms. The chief towns of the east are Epinal, St. Dié, Rémiremont, Sénonès, Val d'Ajol, Cornimont, and la Bresse. In addition to the places in the three chief districts, the following should also be mentioned: Troyes, Nantes, Cholet, Laval, Tarare, Roanne, Thizy, and Villefranche upon the Saône.

Havre and Marseilles are the great cotton ports of France, the former in particular. Marseilles receives chiefly cottons from Egypt and the East. The relative importance of Marseilles has declined greatly in the last quarter of a century, and at present its imports are

insignificant compared with those of Havre. Next to Liverpool, Havre used to be the largest cotton port in Europe, but recently it has been forced to yield that position to Bremen. Yet the imports through Havre, instead of declining, have steadily advanced. "Futures" are used on the market at Havre, but not at Bremen, as has been already remarked.

RUSSIA

Russia's demand for cotton is greater even than that of France. Recently in respect of the cotton industry important advances, constituting almost revolutions, have been made in Russia, and she has been rendered increasingly independent of foreign supplies of cotton yarns and fabrics. Even in the eighteenth century working in cottons was to be found in the districts of Moscow and Vladimir. Cotton-spinning by power was established in Russia by a young Russian, Ludwig Knoop, who had worked in Manchester with a firm of cotton-spinners. In 1839 he was sent as agent of his firm to Moscow, and there he began as a cotton-spinner, importing his machinery from England. Many other Russian merchants followed his example. The growth that has taken place since those days is set forth below.—

AVERAGE YEARLY IMPORTATION OF COTTON WOOL
AND YARN INTO RUSSIA

	Raw Cotton, in thousand tons.		Cotton Yarn, in thousand tons
1824-6	9		5.4
1836-8	4.6		10.1
1842-4	8.4		9.5
1848-50	21.4	...	4.5
1889-91 . .	117.4	...	3.4

At spinning and manufacturing in factories some 320,000 hands find work, about 170,000 in the former occupation and 150,000 in the latter. The extension of the cotton industry in Russia has been exceedingly rapid. Her spindles numbered roughly one million in 1857, almost four millions in 1887, fully six millions in 1899, and more than six millions in 1901.¹ The number of power-looms has grown from 54,500 in 1877 to 84,500 in 1886 and 146,000 in 1899. The location of the industry is shown in the accompanying table —

Government	Factories	Spindles, in thousands	Looms, in thousands
Moscow	56	1,295	33
Vladimir	67	1,224	42
Piotrkov	25	745	20
St Petersburg	24	1,074	11
Jaroslavl	4	347	2
Kostroma	25	274	20
Tver	6	348	9
Esthonia	1	440	2
Ryazan.	4	146	3
Elsewhere	15	198	4
Total	227	6,091	146

It seems rather remarkable that the chief seat of the cotton industry should be placed in the very centre of Russia. The English industry, we are reminded, lies close to the port of Liverpool. But in Russia there is not the same need for proximity to a port, since the home demand is of far greater relative importance in Russia than in England. No doubt Moscow and Vladimir are satisfactory distributive centres for :

¹ The *Textile Recorder* for December 14th, 1901, gives 6,000,000 spindles only.



considerable part of the most populated districts. The chief cotton port on the Baltic is Reval; next to it stand St. Petersburg, Riga, Narva, and Libau. On the Black Sea the chief port is Odessa

Until quite recent times the spinning of fine counts¹—indeed, of any counts above 70's—was unknown. Now the higher counts up to about 140's are being attempted under cover of a protection which wards off English competition. Still, however, the great bulk of the output of Russian mills consists of wefts between 33's and 40's, and twists between 30's and 34's. A comparative estimate of Russian efficiency in the cotton industry, which is very unfavourable to Russia, will be found in Dr Schulze-Gaevernitz's economic study of that country. Russia's competition outside of her dominions is so insignificant that we need not summarise here the results of this investigation.

Russia has attempted by tariff measures to extend the proportion of her consumption of cotton grown within her empire. More than 100,000 tons of the cotton worked up in Russia in 1900 were supplied by the Russian provinces of Central Asia and Trans-Caucasia. The home-grown cotton is coarse, but it appears to be suitable for cheap fabrics.²

SWITZERLAND

In respect of certain cotton goods Switzerland stands undoubtedly in the first rank. The English discoveries were introduced here soon after their appearance, and even in the first decade of the nineteenth century an appreciable number of mills were at work. At the

¹ See note on p 157

² *Drage's Russian Affairs*, p 161.

first International Exhibition, Swiss goods met with universal approbation. Swiss success was all the more remarkable in that the confederacy had made no attempt to foster the cotton industry by protective tariffs. Neighbouring foreign markets in Europe being closed to them by restrictive barriers, the Swiss were compelled to throw themselves into competition with the older industries in markets over the sea. To this fact, perhaps, Swiss efficiency must be in some degree ascribed. The spindles of Switzerland grew in numbers with some rapidity until the middle "seventies", there after came a falling off. The numbers were —

1830	400,000
1850	950,000
1876	1,854,000
1883	1,809,000
1898	1,704,000

The check in the growth of spinning is to be explained by the developing industrialism of Switzerland, neighbours and by the commercial policies adopted to foster it. In addition there existed as a negative influence the diminishing importance of natural advantages connected with water-power, which was consequent upon improvements in steam-engines lowering the cost of fuel per unit of horse-power. The lower counts are produced scarcely at all in Switzerland at the present time, since the old markets for them, notably the Italian, have been lost. To-day the Swiss are famous chiefly for the production of fancy cotton goods including lace and trimmings. Of Swiss spindles in 1898, nearly half were in the Canton of Zurich, 15 per cent. were in Glarus, 10 per cent. in St Gallen, 9 per cent. in Aargau. The total number of mills 1

Switzerland then was 80, and the average number of spindles in each was something over 21,000: there were only four mills containing more than 50,000 spindles. The scale of a business in Switzerland is evidently small, judged by the standards to which the people of Lancashire are accustomed. Of the 30,000 power-looms, approximately, in Switzerland at the present time, a quarter are probably in St Gall: a sixth each are attributed to Appenzell and Zurich. Switzerland's best customers at the end of the nineteenth century were the United States, Great Britain, and Germany.

AUSTRIA

According to Grunzel¹ (*Die österreichischen Baumwoll-industrie*, 1895), many experiments were made in Austria with German machinery at the end of the eighteenth century, but it was not until English machinery had been smuggled into the country that any considerable activity was noticeable in the machine industry. Possibly at the end of the eighteenth century as many as 100,000 people were employed at hand-spinning; but so severe did the competition of machinery become, that by 1812 the hand-spinners could not have numbered more than 8,000. There are now more than 3,000,000 spindles in Austria. In manufacturing the position of Austria is more favourable than in spinning; her trade shows an excess of importation of yarn, but an excess of exportation of manufactures. Austria is one of the countries in which the battle between hand-loom and power-loom still continues, for in Austria there is a large scattered population in partial dependence upon the land, and hence there is unlimited scope for

¹ Quoted from Oppel's *Die Baumwolle*.

domestic industries of a certain character. In England the sound of the hand-loom is exceedingly rare, but in Austria to-day it is frequently heard, and if the number of power-looms has passed that of hand-looms the latter do not fall far short of the former. In Hungary the cotton industry is so slight as to need no special mention. Austrian spinning is located chiefly in Bohemia, Lower Austria, the Tyrol, and Vorarlberg. In each of these districts in 1900 the number of mills and spindles was as follows:—

	Mills.	Spindles.	Average spindles to a mill.
Bohemia . . .	82	1,870,000	22,800
Lower Austria . .	23	460,000	20,000
Tyrol and Vorarlberg	15	435,000	29,000

It is apparent that the number of small mills must be considerable. Altogether in Austria 160 mills, with 3,450,000 spindles, have been counted. In respect of manufacturing by power-loom, far the more important district lies in and about Reichenberg, where 42,000 looms are run by 74,000 hands. In Reichenberg, in addition, some 40,500 hand-looms are surviving. There are also many hand-looms (about 23,000 it has been estimated) in and about Brunn and Olmutz. Special mention must be made of Vorarlberg, which is distinguished for the production of machine-made embroidery.¹ The cotton exports of Austria-Hungary proceed chiefly to the Balkan Peninsula and to the East.

¹ There is a good map showing the location of the Austrian cotton industry, namely, Hickmann's *Verzeichniss der österreichischen Baumwollspinnereien*.

ITALY

Until the early "seventies," the period in which were initiated so many economic as well as political changes on the continent of Europe, Italy, with its 350,000 spindles, was dependent upon foreign countries for a considerable proportion of the cotton goods consumed by her population. But in consequence of a somewhat rapid industrial revolution in Italy, the state of affairs of thirty years ago has been reversed, and to-day Italy ranks among the countries exporting more yarns than they import. It is a feature of interest in the history of the Italian industry that cotton was raised profitably and in appreciable quantities from Italian soil during the American Civil War. On the cessation of hostilities in America, however, Italian cotton-fields shrank almost at once into complete insignificance; in 1864 Italy had raised as much as 100,000 bales of cotton. The enterprise which is working in spinning and the manufacture of cotton is evinced by the growth in the number of spindles.

In 1870 there were	500,000 spindles		
„ 1888	„	900,000	„
„ 1896	„	1,400,000	„
„ 1898	„	2,100,000	„

The number of power-looms reached 70,000 in 1898. In 1896 Italy contained 730 factories of all kinds in which cotton was dealt with and wherein some 88,000 operatives found occupation. These factories could be classified thus:—

Spinning mills only—127 (with 24,200 operatives).

Spinning mills with weaving sheds attached—42 (containing 12,100 looms).

Weaving sheds alone—363 (containing 35,100 looms)

Manufactories (mixed goods)—170 (containing 2,900 looms).

Lombardy and Piedmont possess about two-thirds of all the spindles of Italy : the remaining third is scattered through Venetia, Campania, Liguria, and Tuscany ; recently a spinning mill has been erected in Sicily, near Catania. A list showing the distribution of spindles and power-looms among the chief centres is appended :—

	Spindles.		Spindles.
Turin	179,300	Genoa	76,500
Bergamo	130,100	Salerno	75,000
Como	130,100	Cuorgne	70,000
Milan	94,700	Cuneo	59,800
Novara	93,600	Venice	40,000

	Power-looms.		Power-looms.
Milan	12,200	Pisa	2,850
Turin	7,500	Como	1,610
Novara	4,550	Naples	610
Genoa	2,850	Florence	530

Manufacturing has also attained some importance in Alessandria, Bergamo, Brescia, Cuneo, Massa-Larara, Padua, Pavia, Rome, Salerno, Treviso, and Udine. The chief markets for Italian manufactures were, at the time when Dr Oppel analysed the trade of the various exporting countries, South America, European and Asiatic Turkey, the eastern half of North America, Central America, and Roumania.

BELGIUM AND HOLLAND

In bygone centuries the Netherlands were famed for the manufacture of cottons. It was from the Netherlands that the cotton industry was carried into England, where the most important steps in its development were taken when the Kays, Hargreaves, Arkwright and Crompton, invented the devices by which the productive powers of both spinners and weavers were so enormously augmented. The industry of spinning, after the revolution which it had undergone in England, was reintroduced into the Netherlands by Liévin Bauwens in 1805. In spite of the British laws prohibiting the exportation of machinery, he succeeded in carrying over to Belgium seventeen mules bearing 16,000 spindles in all, and in obtaining forty Englishmen to work them. Rapid development followed this initial effort, and in the "forties" 400,000 spindles were working in Belgium. In 1892 the number of spindles fell just short of the million, but since that time a decline has set in. No more than 880,000 spindles were to be counted in 1898. Of these nearly 580,000 are in Ghent; no other place has as many as 50,000.

Steam spinning was not introduced into Holland until after long delay, and so slow was it in taking root that only 40,000 spindles worked by steam could be returned in 1860. After the "seventies" growth was more rapid, and in 1898, in the district of Twente, as many as 270,000 spindles were active. Half of these were located in the town of Enschede; the rest were to be found in Hengelo, Oldenzaal, Almelo, Veenendaal, and Borne. Nevertheless Dutch spindles are still incapable of satisfying completely the needs of the Dutch

cotton manufacture. In Twente there are 18,700 power-looms—there were fewer than 2,300 in 1861—of which a third are in Enschede and Lonneker, a sixth in Almelo, a ninth in Nyverdaal and Oldenzaal, and the remainder in Hengelo, Borne, Goor, Wierden, Haaksbergen, Ryssen, Vriezenveen, and Delden.

Rotterdam is the chief cotton port of Holland. Amsterdam was never of much importance, and recently its business in cotton had been given up almost completely. Compare, for instance, the imports into Amsterdam in 1883 with those of 1898, some 84,500 bales (of about 500 lbs.) in the former year and less than 9,000 bales in the latter year. Rotterdam received 8,700 metric tons in 1896 and 25,600 metric tons in 1899¹

SPAIN AND PORTUGAL

Spain, a very ancient seat of the cotton manufacture, and greatly famed in the middle ages, no longer occupies a place of any importance. Her 600,000 spindles of seventy years ago have increased, it is true, to close upon 2,750,000, but 2,750,000 is little in comparison with the numbers in other countries. In the fourteenth century the industries in Barcelona and Granada were destroyed by the Moors. A recovery, however, took place in Barcelona, where 2,500 looms are said to have been at work in the second half of the eighteenth century. The Napoleonic wars, followed by civil strife, checked industrial enterprise and ruined its achievements, and it was not until after 1840, when the cotton industry was already seated firmly in the British Isles, that a second revival could be induced. In addi-

¹ A metric ton is 2,204 lbs.

tion to its old district, Catalonia, it appeared also in the Basque provinces, Malaga, Seville, and Corunna. Nevertheless, Barcelona and a number of other Catalonian towns remain the most important of the districts wherein the cotton industry is prosecuted. Barcelona contains more than 100 spinning mills and nearly 450 weaving sheds. Until the war with the United States, which resulted in the loss of two important colonial markets, Spanish trade in cotton goods showed an excess of exports by no means insignificant.

Late in its introduction into Portugal, the cotton industry has of recent years, especially since the "eighties," made there noteworthy advance. Lisbon and Oporto are its chief seats. The cotton spindles, which numbered 160,000 in 1894, have been estimated more recently at 230,000. Portugal exports chiefly to Brazil and the African colonies.

GREECE

Some cotton is grown in Greece, and a manufacturing industry has been developing since about 1870. In 1899 20 spinning mills, with 73,000 spindles and 3,000 operatives, and 12 manufactories with about 1,000 power-looms and less than 1,500 operatives altogether, were at work. Seven of the spinning mills are in Piræus, 6 in Livadia, 3 in Syra, 2 in Patras, and one each in Styliis, near Lamia, and in Chalkis of Eubœa. Of the manufactories 5 are in Piræus, 5 in Syra, and one each in Patras and Argos.

SWEDEN, NORWAY, AND DENMARK

The figures beneath are of some interest in displaying not merely the recent growth of the cotton industry

in Sweden, but also the extent to which the large-scale system of production has been supplanting small businesses. In spite of a largely increased output of yarn, from 7.5 to 11.3 million kilograms,¹ accompanied no doubt by a rise in the average fineness of the yarn, the number of mills remained practically constant. Since 1895 there has been a slight growth, however, and in 1899 as many as 35 mills with 360,000 spindles could be enumerated.

	1884.	1895.
Mechanical spinning mills	28	27
With a yarn production (in million kilograms)	7 59	11.26
With an output worth (in million crowns ²)	12 22	13.57
With workers	3,986	4,931
Weaving factories	29	31
With a fabric production (in million metres ²)	22 10	43.15
With a fabric production (in million crowns)	2 72	1.66
With an output worth (in million crowns)	12 73	15.27
With workers	3,793	3,689

The chief cotton port is Gothenburg, next to it stand Norrköping, Malmö, Gäfve, Warberg, and Landskrona. The cotton-spinning industry of Norway is so insignificant—10 mills in 1896, and 112,000 spindles—that it may be passed by without mention. Norway's and Sweden's importation of cotton yarns and goods surpass their exports by large amounts; the imports proceed chiefly from Great Britain, and secondarily from Germany.

Denmark is still unimportant, though her importations of raw cotton have risen considerably in the last quarter of a century.

¹ A kilogram is 2.204 lbs.

² A metre is 39.37 inches and a crown is worth 15. 1½d.

OTHER COUNTRIES

In the parts of Europe not included in the preceding sketch there is no spinning or manufacturing of any importance, though some spinning may be found at Jedicule, near Constantinople, and in the Macedonian cities of Salonica, Niausta, and Voden. There is also one mill at least in Bulgaria.

CHAPTER VI

AMERICA AND THE EAST

IN dealing with America, we shall notice chiefly the industrial conditions in the United States, but in order to render our sketch of the cotton industry complete, a brief reference must be made to certain other countries of the Western Hemisphere.

In Canada 650,000 spindles were active in 1900. In Mexico, where the first factory was established as early as 1834, there are more than 450,000 spindles. A rough idea of the growth and present position of the cotton industry in Brazil may be gathered from some figures supplied by a consular report of 1899 (511, Miscellaneous Series). According to this report the factories numbered 9 in 1865, 30 in 1875, 51 in 1885, and 134 in 1895. Rio de Janeiro and Minas Geraes are the chief seats of the industry, and much of the machinery is run by turbines and water-wheels.

The early history of the machine cotton industry in the United States has been well summarised in the official volume of the statistics of manufacture of the State of Massachusetts for 1898. In 1786 models of an early form of the Arkwright machines were smuggled into the United States. These were publicly exhibited,

together with a spinning-jenny and stock-card constructed on the order of the State of Massachusetts. In 1788 the Beverly Association began operations with machinery constructed from these models. The second mill was erected in America in 1790, the third in 1795, and in 1798 Samuel Slater, with some of his wife's relatives, began work in a mill which was the first constructed throughout on the principle of the water-frame mills in England. Power-loom manufacturing appeared in 1814. The early factories were established chiefly in the States on the east coast, notably in Rhode Island, Massachusetts, Connecticut, New York, Pennsylvania, and South Carolina. Already in 1831 there were in the United States—chiefly in the so-called New England States—800 factories, 1,250,000 spindles, 33,500 looms, and 62,200 operatives, and the annual consumption of cotton wool was as much as 77,000,000 pounds. Gradually, as a result partly of national aptitude and enterprise, and partly of high protective tariffs, the quantity and range of the American output of cotton goods have been extended, the importation from England per head of the population has been progressively checked, and an export trade has been developed.

The total trade of the United States in manufactured cottons of all kinds, including yarns, for the last thirty years, is stated below. It must be remembered when these figures are being considered that the population of the United States almost doubled in the period for which her trade has been stated. In 1870 it stood at 38,558,000, in 1880 at 50,156,000, in 1890 at 62,622,000, and in 1900 at 76,303,000.

IMPORTS AND EXPORTS OF COTTON YARNS AND
MANUFACTURES

	Imports, million dollars ¹	Exports, million dollars
1870	18 6	3 8
1871	24 8	3 6
1872	29 9	2 3
1873	35 2	2 9
1874	33 1	3 1
1875	27 7	4 1
1876	22 7	7 7
1877	18 9	10 2
1878	19 1	11 4
1879	19 9	10 9
1880	29 9	10 0
1881	31 2	13 6
1882	34 4	13 2
1883	36 9	13 0
1884	29 1	11 9
1885	27 2	11 8
1886	29 7	14 0
1887	28 9	14 9
1888	28 9	13 0
1889	26 8	10 2
1890	29 9	10 0
1891	29 7	13 6
1892	28 3	13 2
1893	33 6	11 8
1894	22 3	14 3
1895	33 2	13 8
1896	32 4	16 8
1897	34 4	21 0
1898	27 3	17 0
1899	32 1	23 6
1900	41 3	24 0
1901	40 2	20 3

¹ A dollar is worth 4s. 2d

American enterprise has brought about in the last few years a very remarkable extension of the American cotton industry, as witness the figures appended :—

	1880	1890.	1898	1903.
Active spindles }	10,653,000	14,188,000	19,411,000	21,214,000
Looms .	226,000	325,000	453,000	488,000

It may aid our realisation of the magnitude of the cotton industry in the United States if we bear in mind, in addition to the figures as to spindles and looms, that, but for a comparatively trifling excess of imports, it satisfies completely the needs for cotton goods of a population of about 80,000,000.

Some indication of the recent lines of movement in the American cotton industry as a whole, before the great expansion of the industry in the South with its cheap labour, is afforded by the accompanying tables from the American eleventh census :—

	Thousands		Percentage increase.
	1880	1890	
Active spindles	10,653	14,188	33·8
Looms .	226	325	43·90
Lbs. cotton consumed	750,344	1,117,946	48·99
Wages . . .	\$42,041	\$69,489	65
Capital	\$208,280	\$354,021	69
Employees, not officers } and clerks }	172·5	218·9	28

An examination in particular of the percentages given in this table will prove instructive. Labour has increased 28 per cent., but capital has increased 69 per cent. It is apparent that the Americans are concentrating their attention on the economies to be derived

from an extensive use of machinery. And while labour has increased 28 per cent., wages have advanced by 65 per cent. From this we may infer that the growing dependence of the American industry upon capital is not proving detrimental to labour. Such a view is corroborated by other figures and by the recent investigations of Mr. Young, to whose work we shall make fuller reference shortly. There has been no lack of employment in the American cotton industry, on the contrary, we are told that some mills in the Southern States have been unable to get to work through the dearth of labour. The conditions of the South, however, it may be argued, are exceptional at present, but even in the north-east good hands have certainly not been standing idle in the market-place for many days together. Moreover, the growth of the industry in the South is in itself an indication that supplies of good labour were not by any means a superfluity in the North. Apparently the economies caused by industrial specialism and the enterprising adoption of new inventions have so appreciably lowered the cost of production of cotton goods, and therefore encouraged their output, in the United States, that any diminution of the demand for labour, even for a short period, has been prevented.¹ Moreover, greater efficiency in labour has been rendered one of the most pressing wants in the United States, and this in itself has raised the wages of the more capable

¹ Recently piece-rates at Fall River have been twice reduced (10 per cent. in November, 1903, and 12½ per cent. in July, 1904,) but piece-rates might fall as real wages rose, it should be observed, though there is no doubt that in this case weekly wages have diminished for a time. The late reductions, so far as they are real reductions, probably mean fluctuations due to the cycle of trade, or the high price of cotton, or the sudden competition of the South, after a higher rise in wages previously than the circumstances justified.

operatives and tended to raise the efficiency of the less capable. Weekly wages are higher in the New England States than in England, and English wages stand far above those of the Continent. But Mr. Young, in his recent book on the American cotton industry, argues that the American cotton operative is not superior to the English operative, and frequently, according to Mr. Young, "the cotton operative in the United States is a French Canadian, a German, an Italian, a Hungarian, an Albanian, a Portuguese, a Russian, a Greek, or an Armenian." The policy of the American industrial captain appears to be to spend on machinery and cotton, and save on labour, without saving on wages, labour being economised and worked hard for long hours.

The American real cost of production and money cost of production of certain classes of goods are very low to-day, owing largely to the specialising of factories and the extended application of machinery, the price of which, on the whole, is much higher in the United States than here. Indeed, some English machinery is still to be met with in the United States, the 45 per cent. *ad valorem* tax upon it notwithstanding. High efficiency is shown chiefly in the production of coarse counts and fabrics; the Americans excel at manufacturing on a large scale, and at a low price, goods of a moderate quality, which can be repeated. An example of American industrial policy is to be found in the ready introduction of automatic looms. Thousands of old looms have been "scrapped" to make room for them, and soon their numbers will have reached 100,000. From twelve to twenty are managed by a single operative. Mr. Young, in the course of his tour, visited the mill and weaving shed started by the Northrop Company

to give working illustrations of the value of their machinery as an advertisement. This mill, which is situated at Burlington, Vermont, contained 55,000 spindles and nearly 1,300 of the new looms. Of the latter, Mr. Young wrote:—

“The looms are of two sizes, 32-inch and 44-inch, and of the narrower looms three weavers run eighteen each, thirty-nine weavers run sixteen each, one weaver runs fifteen, four weavers run fourteen each, seven learners run eleven each, and three learners run eight each—fifty-seven weavers and learners to 850 looms, or an average of very nearly fifteen looms each. Of the wider looms seventeen weavers run sixteen each, twelve weavers run twelve each (these on striped fabrics), three learners run eight each, and one learner runs three—thirty-three weavers and learners to 447 looms, or an average of thirteen and a half looms each. The cotton used is ‘good middling,’ about $1\frac{1}{8}$ inch staple, and Mr. Draper told me that a production equal to 95 per cent. of the theoretical maximum capacity of the looms had been attained.”

We may take as another example of the economy of labour the use made of warping mills. In one mill Mr. Young found thirty-five warping mills, and only seven people “tending” them. In England the rule is, or was recently, one mill to an operative.

Fall River is the most important cotton manufacturing place in the United States. Its climate is much like that of Lancashire. The number of mills at Fall River was eighty-seven in 1902, and the spindles and looms amounted respectively to about 3,000,000 and 16,000. The magnitude of the former number will be realised when it is remembered that the whole of Massachusetts,

in which Fall River lies, contained in 1898 fewer than 8,000,000 spindles. The looms of this State, however, amounted in the same year to 182,000. To make a comparison with England, Fall River has three-fifths as many spindles as Bolton, a little more than a quarter as many as Oldham, and more than any other English town, while of power-loom it possesses fewer than Oldham or Chorley, which stand respectively twelfth and thirteenth of our weaving centres ranged according to their wealth in spindles. The whole of Massachusetts has half as many spindles as Oldham and Bolton together, and fewer looms than the united possessions of Burnley, Blackburn, and Preston

“New England contains two-thirds of all the cotton spindles and three-fourths of all the looms in the United States, and makes about four-fifths of all the print-cloths (plain calicoes) manufactured in the country. The local statisticians boast that Fall River alone has more than one-seventh of all the cotton spindles in the Union and nearly one-fourth of those in New England, and manufactures over three-fourths of all the print cloths. It has more spindles than any State except Massachusetts (in which it is), as many as all the Southern States could muster until a few years ago, and twice as many as any other city in the United States. It claims to produce two miles of cloth in every minute of every working-day in the year. Its mills, although mainly employed in the manufacture of print cloth, make every sort of cotton textile, from rough shoe linings to the finest dress materials—twills, jeans, sateens, lawns, leno and lappet cloths with silk weft, fine zephyrs, lace curtains, and crochet and Marseilles quilts. And Fall River not only spins and weaves these fabrics, but bleaches, prints, and finishes them. Its

industries support a population of 105,000 people, of whom the last census showed only about 15,000 to be of American parentage. Of the rest, 15,000 are English, 25,000 Irish, 30,000 French Canadian, 5,000 Portuguese (mainly from the Western Islands), and about 15,000 of Armenian, Russian, Italian, or other foreign parentage."¹

One reason for mills being attracted to Fall River was the river. Water-power is still used there to-day; but turbines have taken the place of the old-fashioned water-wheels, and water-power is now supplemented by the power of steam. In Lancashire also for many years the factories were attracted to watercourses, especially factories using the water-frame, since to work it a considerable quantity of power was required. But in Lancashire no water-supplies existed equal to those of Fall River, and therefore the attraction of the mills to rivers in Lancashire was a decentralising influence: mills sprang up in the country, far from each other, wherever there was adequate power. When the steam-engine had passed its experimental stages it was rapidly substituted for water-power, since with the use of the former the economies of centralisation could be combined. At Fall River, on the contrary, concentration and the use of water could be secured at the same time, hence the factories with machinery driven by water, instead of being gradually deserted when the steam-engine became popular, merely supplemented their water-power with steam-power and developed on the old site. Some of the mills at Fall River now derive all their power from steam.

¹ Young's *American Cotton Industry*. In addition to this work another book on the American cotton industry is just published, namely, Uttley's *Report to the Electors to the Gartside Scholarships* (Manchester University)

The most significant feature of American development is the growth of the industry in the Southern States. In 1880 the South contained about half a million spindles twenty years later they had passed six millions, and to-day they are said to number nearly eight and a half millions. In addition the Southern States are reported to contain some 200,000 looms. Here, perhaps, it would be of interest to show the distribution of spindles and looms among the leading centres in 1898.

North	Spindles in 1898	Looms in 1898.
Massachusetts	7,907,388	182,193
Rhode Island	2,132,350	40,085
New Hampshire	1,323,378	35,230
Connecticut	1,059,244	21,926
Maine	908,208	24,139
New York	735,971	15,474
Pennsylvania	438,435	18,990
New Jersey	398,494	2,300
South		
South Carolina	1,260,536	38,293
North Carolina	1,029,924	23,704
Georgia	799,977	18,504
Alabama	314,227	6,652

There is a rough concentration of industry in the Southern States, though it is apparent from the table above that very many spindles and looms are scattered widely over the Southern district. Charlotte, in North Carolina, is the natural centre, and the mills are distributed most densely along the line of the Southern railroad. This is known as the Piedmont district. Within a radius of about 100 miles from Charlotte there are now more than four million spindles and 100,500

looms, that is roughly 50 per cent. of all the spindles and looms in the Southern States.

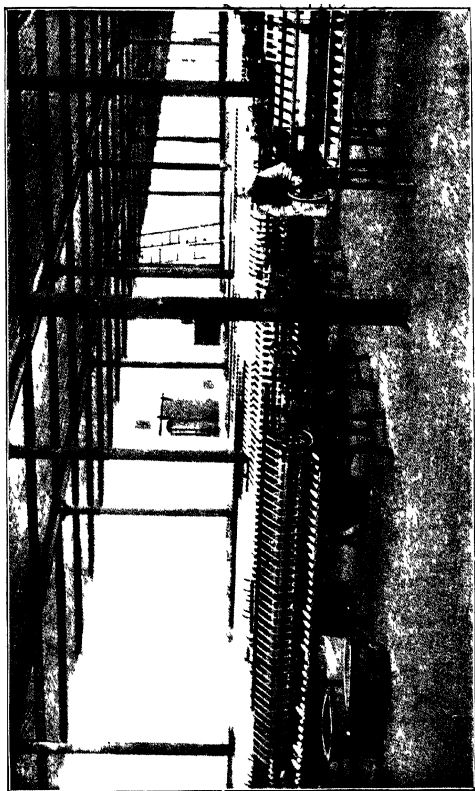
As another sign of the growing magnitude of the industry in the Southern States, we may take the consumption of cotton, which has advanced enormously in the last few years.

CONSUMPTION OF COTTON IN THE AMERICAN
SOUTHERN STATES

Annual average	Bales
1876-80 .	163,800
1881-5	269,200
1886-9	452,600
1891-5 .	716,600
1895-1900 .	1,233,000

In the year 1900-1 the consumption had become 1,667,000 bales, and in the year 1901-2 it failed to reach two million bales by 3,000 bales only. Great Britain probably consumed no more than 3,400,000 bales in the year 1897-8 this figure will afford a basis for comparison.

One cause for the surprising growth of the cotton industry in the Southern States is proximity to the cotton-fields, but this is a less important consideration than at first appears. Another cause is cheap supplies of labour—not of black labour, but of white labour, for Negroes will not as a rule work in factories. The Southern States contained large supplies of half-occupied white labour, scattered over wide areas, and living generally upon the land. From the families of these agriculturists the wages offered at the factories have attracted large numbers. But now wages are rising in the South partly owing to the intense demand for labour, partly owing to the fact that the organisation of



the operatives has begun in the South. Emissaries from the Northern operatives have visited the South to prevent as far as possible the competition due to low wages. There is no reason to suppose that any sensational cheapness of production must be looked for continuously in the Southern States.

The Massachusetts Bureau of Statistics of Labour has recently made an investigation into the conditions of cotton manufacturing in the Southern States. The report emphasises first the cheapness of labour, which is drawn from the decayed hand-industry in the mountain districts of Kentucky and North Carolina and from the families of small farmers who settled in the South after the war. But it is pointed out that wages must continue to rise, and that on the whole the efficiency of labour in the South is beneath that of labour in the New England States. The device of sending Southern workers to gain experience in Northern mills, in the hopes that on their return they would by instruction and example raise the level of efficiency of Southern operatives, has actually been tried, and we are told that attempts have been made to induce Northern operatives to emigrate to the South. Shorter hours, too, must be looked for and less abuse of child labour. Already a dearth of labour is being experienced, and the forces tending to equate the real labour cost in the South with that in the North is being felt, in some places intensely. It is not easy to compare statistically the efficiency of cotton operatives who are working on different classes of commodities and on different systems. Value of the product per operative is some guide. This was, in 1900, \$1,200 in Massachusetts, \$1,010 in Georgia, \$937 in North Carolina, and \$984 in South Carolina. These

figures, culled from the census, are too favourable to the South as indices of efficiency, since more machinery per head is used on an average in the South and the capital charge per unit of produce is therefore higher there than in the North. Reckoned per spindle, the numbers of operatives employed in the three leading Southern States were in 1900, expressed as percentages of the number employed in Massachusetts, 53 per cent. in Georgia, 43 per cent. in North Carolina, and 55 per cent. in South Carolina. These figures will guard us against imagining that the average business must be much smaller in the South than in the North because 565 operatives were engaged per establishment in Massachusetts in 1900, whereas the corresponding numbers for Georgia, North Carolina, and South Carolina were respectively 273, 171, and 378

The abuse of child labour in the South is less already than it was, but still conditions in this respect appear to be very bad in some places.¹ A great deal of youthful labour is employed, as the table beneath of the proportion of different classes of people employed in the cotton industry in the chief centres in 1900 indicates.

	Men, 16 years and over.	Women, 16 years and over.	Children under 16.
Massachusetts	48 98	44 59	6 43
Georgia	39 98	35 52	24 50
North Carolina	42 22	34 23	23 55
South Carolina	44 43	28 72	26 85

¹ The employment of children under 12 (except under conditions) is illegal in North and South Carolina, and in Georgia the mill masters have agreed among themselves not to employ children under 12, except the children of widowed parents, who may begin work at 10 years of age, but, says the report from which we quote (which admits improvement nevertheless), "it certainly seemed as though the intention was honoured more in the breach than in the observance, or that there must be many widows in the neighbourhood of the cotton mills"

As to the advantage of proximity to the cotton fields the report speaks somewhat hesitatingly, but no doubt this advantage will become pronounced as the facilities for making use of it develop. Certainly it is a remarkable fact that the percentage of freight charge on raw material in 1900 was on an average \$1.20 in Massachusetts, \$2.18 in Georgia, \$1.59 in North Carolina, and \$1.17 in South Carolina, but the explanation probably is the slightly higher average quality of the cotton used in the North, and the lowness of freights due to the excellence of organisation by which cotton is shifted to the New England States. Those responsible for the report, however, feel no doubt as to the magnitude of the gains made on total freights by Southern mills in the supply of Southern markets.

In addition to the causes already enumerated for a low cost of production in the South, the President of the New England Cotton Manufacturers' Association hinted in an address delivered in September, 1904, that insufficient advantage had been taken by the North of recent improvements in machinery. In the South, no doubt, it was easier to make greater use of the new machinery, since little "scrapping" of old machinery was necessitated, and the Southern mills are specialised in a higher degree to produce the goods for which the new machinery is best suited than the Northern mills. It seems, indeed, as if a rough demarcation of work were going to be drawn between South and North in the United States, the latter concentrating more exclusively in the finer work: perfect demarcation will be prevented by many causes, of which the chief is the handicap on freight suffered by each industry in the local market of the other. The average "number" of yarns spun in

1900 was 25 10 in Massachusetts, 14·37 in Georgia, 18 83 in North Carolina, and 19 04 in South Carolina, but Southern spinning has certainly become finer in the last ten years on the showing of the American census. An examination of the fabrics produced indicates the same preponderance of the coarser in the South.

On pages 153 and 154 a table is given of the lines of American export. From this table it will be seen that the bulk of the goods sent abroad proceed to places in the Americas and to China, the exports to Europe being comparatively insignificant. That the trade of the United States should be considerable with American States not within the Federation, and with Canada, is not surprising in view of the position of those markets with reference to the cotton industries in the United States and in Lancashire. Canada alone of our colonies takes any large amount of cotton manufactures from the United States. In the year ending in June, 1903, Canada imported cotton manufactures to the value of £1,728,000, of which £540,000 worth came from foreign countries: the United States alone contributed nearly three-quarters of the latter amount, namely £369,000 worth.

The rapid growth of America's trade with the East has attracted some notice. Taking the imports of cotton goods into Shanghai in the period 1893 to 1901, we find that in respect of cotton drills the pieces from the United States increased threefold, while those from England diminished, and that in respect of sheetings the American goods increased almost as much as the imports of drills, while ours again suffered diminution. Moreover, the total number of American pieces, of both kinds of cloth taken together, received at Shanghai, was

four or five times greater at the end of the period mentioned above than the number of Dutch and English pieces delivered at the same port. These facts would appear to be explicable partly by the specialism of American manufacturers in the production of the particular classes of goods in which the trade has taken place and the low relative cost of production reached under their methods. We should not omit to notice, moreover, as a contributory cause, that the rates at which the American goods were carried were for a time exceptionally cheap in comparison with the rates that had to be paid for transport by British manufacturers. But, after all, the total trade of the United States with China is less than a million pounds sterling in value, whereas ours is worth roughly six times as much, and while America's total exports of cotton goods have never reached £9,000,000, ours have sometimes passed £70,000,000.

EXPORTS OF COTTON MANUFACTURES FROM THE
UNITED STATES TO VARIOUS COUNTRIES FOR
THE YEAR ENDING JUNE 30TH, 1901

Countries to which exported.	Cloths.		Wearing apparel. Thousand dollars.
	Coloured Thousand dollars	Uncoloured. Thousand dollars.	
EUROPE			
Germany	33 9	12 7	85 9
United Kingdom	310 1	298 3	345 9
NORTH AMERICA			
Dominion of Canada—			
Quebec, Ontario, Mani- toba, etc. }	242 7	202 9	275 1
British Columbia .	4 6	6 5	97 1

Countries to which exported.	Cloths		Wearing apparel Thousand dollars.
	Coloured Thousand dollars.	Uncoloured Thousand dollars	
Dominion of Canada—			
Nova Scotia, New Brunswick, etc }	100	5	16 5
Costa Rica	109 5	50 5	21 7
Guatemala	96 0	55 5	10 7
Honduras	87 3	85 0	18 5
Salvador	65 9	123 7	6
Mexico	179 4	85 3	93 7
West Indies—			
British	252 2	91 9	58 1
Cuba	146 1	109 5	48 2
Dutch	91 8	22 2	2 0
Harti	687 0	34 4	15 8
Santo Domingo	206 0	55 8	13 8
SOUTH AMERICA			
Argentina	36 3	79 0	3 3
Brazil	259 3	70 8	8 7
Chile	78 6	565 4	2 3
Colombia	729 0	112 3	22 0
Peru	28 8	90 3	1 1
Venezuela	662 7	217 7	3 2
ASIA			
Chinese Empire	1,371 4	3,181 2	25 9
East Indies—British	224 3	207 7	1 1
OCEANIA			
British Australasia	259 4	93 6	223 4
British Africa—East	1 8	154 4	—
„ „ South	7 3	86 5	50 4

A dollar is worth 4s. 2d.

THE EAST

Turning to Asia, we find the cotton industry scattered sporadically through certain regions, and flourishing in India, Japan, and China. In certain cities of Asiatic Turkey, for instance at Smyrna, Beirut, Tarsus, and Adana, coarse twists are spun with success, and in and about Aleppo manufactures are produced in small quantities at a cost which finds them a ready market.

INDIA

The year 1851 saw the opening of the first cotton mill in India. In 1876 Indian spindles and power-looms stood roughly at 1,000,000 and 9,000 respectively, and by the beginning of the twentieth century there were 5,000,000 spindles in India, and more than 40,000 looms. In respect of coarse counts, India is cutting us out as an exporting country to the East. More than 450 million pounds of yarn are produced annually as a rule, but the counts are, on the whole, very low, though, indeed, higher counts—which do not, however, touch as a rule the yarns known as ‘Bolton counts’ in respect of fineness—are being turned out now in greater numbers. In spite of the successful ventures in power-manufacturing, the domestic industry still flourishes on a magnificent scale, more particularly in the Madras Presidency and the Central Provinces. In the latter district alone there were reckoned to be nearly 150,000 hand-looms in 1883, and the number of hand-looms in 1870 in the Madras Presidency was placed as high as 300,000.

The successful competition of India in the East is traceable largely to geographical conditions. India spins from her own cotton, and saves again on the cost

of transport to Chinese markets. True, she must import machinery and coal, but it appears that this disadvantage does not completely nullify her advantages. As to Indian labour being very inefficient at present, there can be no doubt. At least three times as many Indian operatives as Lancashire operatives are required to produce approximately the same result from a given quantity of machinery. The labour cost of production in India, though Indian wages are but a fraction of those paid in Lancashire, is higher than the labour cost in Lancashire. Wages in India ranged recently, according to the *Indian Textile Journal*, from 26s. 8d. to 36s. per month for a spinner, 18s. 6d. to 21s. 4d. for the first piecer, and 13s. 4d. to 14s. 8d. for the second piecer. For these wages the hours are 12 to 14 per day. As the Hindoo factory worker is not very efficient, we can understand that even in manufacturing he cannot compete with the British operative in fine goods. The East Coast of Africa, it might be thought, would be an easy market for India to win; yet we learn from our Consul's report in 1901 that though most of the rough goods come from India, the fine goods are procured from England. Germany, it is of interest to note, sent recently to this market 40 per cent. of the singlets and underclothing that were imported.

From the tables beneath, the present position of the factory system in India, as applied to the production of cottons, may be gathered, together with the distribution of the industry throughout the British provinces, and the extent and direction of her trade.

PARTICULARS RELATING TO COTTON MILLS IN INDIA.
AVERAGE FOR THE PERIODS 1898-1899, 1899-1900,
1900-1901

The number of mills in 1898-1899 was 175
 " " " " " 1899-1900 " 186
 " " " " " 1900-1901 " 190

	1898-1901.
Power-looms (thousands)	38·8
Spindles (millions)	4·7
Persons employed (daily average in thousands)	158

Yarn produced—¹

Counts 1 to 20 (million lbs)	384·4
Counts above 20 " "	64 5

Yarn produced in British provinces—

Bombay (million lbs.)	327·6
Bengal " "	33·2
Madras " "	30·2
United Provinces (million lbs)	31 6
Central Provinces " "	19·1
Punjab " "	7 23

Woven goods—

Grey (million lbs)	83·1
Others " "	13 5

Ten years previously the number of mills had been 127 only. In the period 1891 to 1901 the number of power-looms advanced from 24,700 to 40,500, and the number of spindles from 3·27 to 4·93.

¹ The fineness of yarns is measured, the reader may be reminded, in hanks (840 yards) per lb. (English reckoning) thus 20's mean yarns of 20 hanks to the lb. These indices are known as "counts" or "numbers."

IMPORTS AND EXPORTS OF COTTON GOODS AND
EXPORTS OF INDIAN RAW COTTON IN
THOUSAND POUNDS STERLING

Countries.	1899-1900.	1900-1.
Imports of cotton manufactures—	£	£
United Kingdom .	17,276	17,368
Imports of twist and yarn—		
United Kingdom .	1,564	1,572
Exports of Indian piece goods, etc —		
Straits Settlements .	228	360
Ceylon	167	178
Aden	125	90
Zanzibar, etc.	93	50
Portuguese East Africa	47	49
United Kingdom	37	35
Other countries	218	260
Total .	<u>915</u>	<u>1,022</u>
Exports of Indian twist and yarn—		
China, Hong Kong	2,046	1,663
„ Treaty Ports .	2,347	871
Straits Settlements	99	111
Aden .	50	35
Other countries	59	101
Total .	<u>4,601</u>	<u>2,781</u>
Exports of Indian raw cotton—		
Japan	3,730	1,223
Germany	762	1,186
Belgium	401	1,106
Italy .	540	799
Austria-Hungary .	282	745
France .	245	544
China, Hong Kong	201	195
„ Treaty Ports .	241	18
United Kingdom .	140	707
Other countries .	75	215
Total	<u>6,617</u>	<u>6,738</u>

JAPAN

Owing to the recent development of Japan it will be desirable here to examine the conditions of her trade and industry somewhat closely. Cotton-spinning was established in this rising nation of the East in 1865, when spinning machinery carrying 6,000 spindles and the corresponding preparatory machinery were imported from England. At first growth was slow—by 1870 only three mills could be counted in all Japan. The boom in the erection of cotton mills occurred on the return to their native country of some graduates of the Imperial College of Engineering, who had been to England to study the construction and working of cotton machinery.¹ The readiness to learn from foreigners which is exhibited by this incident, and is characteristic of the Japanese, and the enterprise which leads them to travel abroad with the object of gaining information about the industrial and commercial methods of other countries, helps to explain Japan's rapid economic advance. The location of the cotton mills and the value of the output of the various places in yarn for a recent year are stated beneath :—

	Thousand £s.		Thousand £s.
Osaka . . .	1,226·5	Nara . . .	111·5
Hyogo . . .	495·5	Hiroshima	91·3
Okayama . .	374·4	Kyoto	82·2
Miye . . .	238·1	Wakayama	79·2
Tokyo . . .	227·9	Ehime	70·5
Aichi . . .	224·3	Kajawa	36·4
Fukuoka . .	168·1		

¹ As to the above see Dyer's *Dai Nippon, the Britain of the East*

The cotton industry has grown to maturity with marvellous rapidity. The capital invested trebled in the ten years between 1892 and 1902. In the same period the number of mills about doubled, and since concurrently the number of spindles increased nearly threefold, the size of the typical factory must have been added to by about a hundred per cent. By the typical factory we mean the kind and size of factory becoming usual—not, for instance, the idea of size reached by dividing the number of mills into the number of spindles. In estimating a type the average misleads, owing to survivals which it does not pay to destroy. Further, the proportion of operatives to machinery diminished in consequence, among other causes, of the improvement in the efficiency of labour. It is satisfactory to notice that the conditions of labour were ameliorated in almost every respect in this decade, and that therefore the advantages associated with a developed industrialism were shared with the manual workers. It is noticeable also that the beneficial effects of greater productive efficiency were felt almost immediately by the labour concerned. The annual working days, it is true, rose from 290 to 312, but the daily working hours fell from twenty-two to nineteen (for two shifts), and the wages of male operatives doubled, while those of female operatives almost doubled. A conspectus in which the averages for two periods are contrasted is printed below. In the first period the number of mills was 39, 40, and 45, respectively, in each of the three years concerned, and in the second period the number of mills was 80 in 1900 and 1901 and 81 in 1901.

THE EAST

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	Gross Amount of Capital invested	Average No of Spindles used daily	Quantity of Raw and Ginned Cotton demanded	Total Production of Cotton Yarn	Average No of Male Operatives daily employed	Average No of Female Operatives daily employed	Annual Working Days	Daily Working Hours	Average Daily Wage of Male Operatives	Average Daily Wage of Female Operatives
1892-4	Thousand £s 1,123	Thousands 420	Million lbs 112.9	Million lbs 97.9	6,916	21,695	290	22	d d 4-4½	d d 2-2½
1900-2	3,569	1,209	335.3	288.0	13,373	50,271	312	19	d 7½	4½-5

Japan exports a far greater value of yarns than of fabrics. The description of her classes of exports, and the values of each that appear below, have been extracted from the fourth Financial and Economic Annual of Japan, which was issued in 1904.

AVERAGE ANNUAL VALUE OF COTTON-GOODS

	EXPORTED	1901-3 Thousand £s
Cotton yarns		2,426 2
Cotton blankets		29 9
Cotton tissues, flannel		64 6
Cotton tissues, chiyami		40 1
Cotton tissues, white		96 2
Cotton tissues, grey shirtings		176 5
Cotton tissues, T cloth		180 6
Towels		71 7

Almost the whole of the yarns exported proceed to China; of the manufactures, the bulk is taken by China, Hong Kong, and Corea. The Japanese fabrics exported to the mainland are said not to conflict with Lancashire goods, but to compete rather with native Chinese manufactures. British exports of cotton cloths to China are from fifteen to twenty times greater in value than the exports of Japan to the same market. Of the Japanese goods sent to China Mr. Brennan wrote in 1897 :—¹

“They are the narrow width strong cotton cloths, which in China and Japan are made in hand-loom by millions of yards, and which our English manufacturers have never succeeded in producing at the price. It may seem strange that the product of the Japanese hand-loom

¹ *Miscellaneous Foreign Office Reports*, No. 440

should be able to undersell the Chinese article, labour for labour the Chinese is the cheapest, but the explanation probably is that the Japanese weaver can get his yarn more cheaply than the Chinaman."

The great majority of the spindles in Japan are ring-spindles, which recently formed about 95 per cent of the total. Osaka, as we have seen, is the chief seat of the spinning industry. The counts produced are usually low—the average is said to be about 18's—higher counts have been attempted, but hitherto with scanty success. All the mills in Osaka run day and night, the hours will be found stated in the table above. The system is found to pay and to meet with no serious opposition from the operatives, although it was stated to Mr. Brenan by one mill-manager that night-work was 30 per cent. less productive than day-work. Far more hands are employed in Japan upon a given quantity of machinery than in England. This is largely due to the inferiority of the Japanese operatives, but it is partially due also to the fact that the low wages paid to cotton operatives in Japan render it economical there for the proportion of labour to machinery to be high. Yet, even with the greater relative quantity of labour, the output per spindle per hour is less in Japan than in Lancashire, the same counts being taken and the output of day-shifts alone being reckoned.

In contrasting the state of labour in two countries with a view chiefly to future prospects, the capacity of labour is more important than its efficiency. By its capacity we mean its potential power or inherent possibilities, whereas by efficiency is meant present competency. Comparative efficiencies give us rough ideas of capacities, but the ideas are very rough when the

performances of a people in an industry new to them are being examined. It is difficult to realise the capabilities of a nation or social group when it is in a state of transition, and we are compelled to rely largely upon the impressions of foreign residents, who may, as we know from experience, go far astray from lack of the right kind of insight. There seems to be no reasonable doubt, however, that the industrial capabilities of the Japanese are higher than their present industrial efficiency indicates, and since, moreover, they are a people quick to learn, we may expect the gap between our real costs of production and Japan's to close in a greater degree and more rapidly than the similar gap between our real costs of production and those of India.

Many of the Japanese mills pay from 10 to 20 per cent. per annum, according to Mr. Dyer, whose recent work, *Daï Nippon, the Britain of the East* (1904), contains an interesting account of the industrialism of Japan. There are many mills, nevertheless, which have been much less successful, and as a result in a recent year (which year exactly Mr. Dyer does not say) the average dividend of all cotton mills was 6·2 per cent for the first half of the year and 3·5 for the second half. These averages, in Mr. Dyer's opinion, are of doubtful worth, because extraordinary diversity between local conditions and the conditions of particular mills is to be found in Japan, as we should naturally expect in view of the rapid changes that have taken place recently.

Of the organisation of Japanese mills Mr. Brennan writes :—

“As to the management of Japanese spinning mills and their efficiency, my own knowledge does not allow

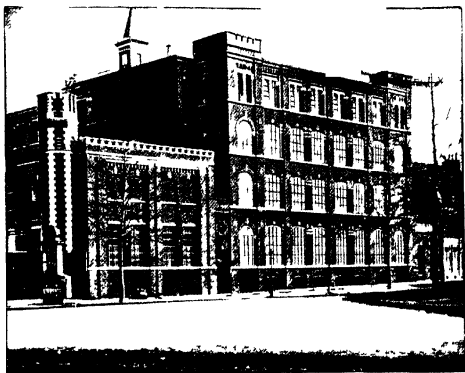
ne to form an opinion, but I have had the advantage of visiting some mills in the company of practical cotton spinners and of discussing the question with Englishmen who are thoroughly competent to speak on the subject. Their criticisms are not flattering to the Japanese management, and, in their opinion, the conditions which have been telling in favour of Japanese spinning mills are tending towards a modification which will deprive the Japanese industry of the advantages it has been enjoying. In the opinion of these experts, the Japanese who have undertaken the spinning of fine yarns have begun too soon, for they have neither the operatives required for fine work nor the men qualified to act as overmen. The great care that is necessary in the earlier stages of the process is entirely wanting in the Osaka mills, with the result that the out-turn is of inferior quality, and much time is wasted owing to the frequent breaking of the threads. The Japanese managers of the mills are men who have had but little experience. As in so many other departments, they believe that theoretical knowledge can take the place of practical experience, and they discharge their instructors before they are competent to proceed alone. In the same way, the overmen are persons without experience, quite unable to detect imperfect work, provided the spindles keep running without an actual breakdown, they are satisfied, and seem to pay but little attention to the quality of the work. In the coarser counts, what an English expert described to me as dirty, slovenly work, is of less importance, but when it comes to finer work he is of opinion that, from the manager to the operatives, all have to gain much experience before they can succeed in spinning with profit anything much finer than 40's. The lack of order and organisation would drive any English manager to despair, and the long hours and cheap labour are of

doubtful advantage if they are inseparable from indifferent work."

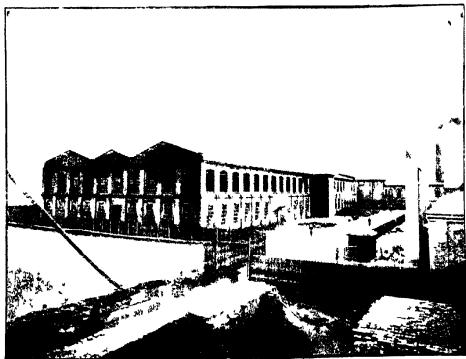
This is somewhat severe on the Japanese, and it must be remembered that their efficiency is advancing apace. In view of the recent introduction of the factory system, their present attainments are remarkable.

At first sight it may appear curious that the factory system in the cotton industry of Japan is at present confined almost entirely to spinning. It has, however, been a general experience among nations capable of undertaking both spinning and weaving that the organisation of the former on a large scale precedes the organisation of the latter. The explanation is that the economy derived from power-spinning is greater than that derived from power-weaving, as looms are, on the whole, at present. In Japan hand-looms are to be met with almost everywhere. Their cost is insignificant, while their efficiency is about half that of power-looms—but four or five power-looms can be managed by one person. At present, in consequence of the slight cost of the hand-loom, the character of the people, and the rate of economic development, there is no conspicuous tendency for the hand-looms to be displaced.

Raw cotton is imported from British India, China, Dutch India, Egypt, and the United States. In Japan the cultivation of cotton has gradually but steadily declined; but at the present time efforts are being made to render the cultivation of American upland cotton in Japan successful, and the efforts hitherto have not been entirely unavailing. There is said, however, to be little disposable land that is suitable for the purpose.



H I F T A G E



N O C M I E A H I C T A

CHINA

More recent and less considerable is the factory system in China. Of its power-spindles more than 300,000—that is about three-fifths of the total—are in Shanghai. Despite the extent of production in spinning mills, there are no signs of any success attending manufacture by power-loom. The system of home-work is so deeply ingrained in the habits of the people, and so low is the cost of their labour owing to their simple, unambitious lives, that power-loom cloth at the cost at which it can be placed in Chinese markets does not easily supplant the home-made fabric.

APPENDIX

Country	No. of Spindles ¹	No. of Power Looms ¹	Exports of Yarns and Manufactures in million £s	Imports of Yarns and Manufactures in million £s	Excess of Exports (+) or of Imports (-)
Great Britain	49,727,000	719,400	1877-81 . 70 8 1889-93 . 68 0 1897-1901 68 0	21 30 49	+68 7 +65 +63 1
United States	21,214,000	488,000	1877-81 11 7 1889-93 12 3 1897-1901 22 1	24 8 30 9 36 5	-13 1 -18 6 -14 4
Germany ²	8,434,000	212,000	1877-81 5 05 1889-93 . 8 9 1897-1901 11 5	7 2 2 96 4 5	- 2 2 + 5 94 + 7 0
France	6,150,000	106,000	1877-81 . 2 8 1889-93 . 4 2 1897-1901 6 2	4 2 2 6 2 2	- 1 4 + 1 6 + 4 0
Russia	6,000,000	146,000	1877-81 . — 1887-93 7 1897-1901 . 1 4	3 8 1 2 1 2	- 3 8 - 5 + 2
India	5,000,000	42,000	1899-1900 12 1 1900-1901 . 10 5	19 6 19 9	- 7 5 - 9 4

Austria	3,450,000	80,000	1877-81 1889-93 1897-1901	13 5 6	23 15 12	- 10 - 10 - 6
Spain	2,600,000	68,500	1877-81 1889-93 1897-1901	— 13 17	4 5 3	- 4 + 8 + 14
Italy	2,435,000	80,000	1877-81 1889-93 1897-1901	— 4 17	12 14 4	- 12 - 10 + 13
Switzerland	1,600,000	30,000	1889-93 1897-1901	57 59	12 14	+ 45 + 45
Japan	1,333,000	—	1877-81 1889-93 1897-1901	— 1 26	— 13 20	— - 12 + 6
Greece	80,000	1,200	1867-70 1897-1901	Insig- nificant.	4 35	—

¹ The number of spindles and looms given is taken as a rule from estimates made by Mr Samuel Andrew, but in a few cases, in which there have been somewhat large discrepancies between his figures and figures supplied by other authorities, a rough average has been struck, or another estimate has been taken

² The figures of trade include Hamburg, but Bremen is excluded from the figures for 1877-81, though included in those for the later period. The trade with the places now outside the Zollgebiet are not taken into account in any of the periods

Country	No of Spindles ¹	No of Looms ¹	Exports of Yarns and Manufactures in million £s	Imports of Yarns and Manufactures in million £s	Excess of Exports (+) or of Imports (-)
Belgium	880,000	—	1877-81 8 1889-93 9 1897-1901 10	5 10 14	+ 3 - 1 - 4
Canada	700,000	18,000	1877-81 — 1889-93 6 1897-1900 1	16 8 12	- 16 - 2 - 11
China	600,000	1,200	1877-81 — 1889-93 1 1897-1901 3	59 1295 243	- 59 - 1185 - 240
Mexico	500,000	15,000	1897-1901 —	11	- 11
Holland	356,000	10,000	1877-81 35 1889-93 38 1897-1901 34	44 29 36	- 9 + 9 - 2
Sweden	372,000	10,000	1877-81 — 1889-93 2 1897-1901 07	5 8 6	- 5 - 6 - 53
Brazil	300,000	15,000	—	—	—

Portugal	230,000	—	1877-81	—	4	—	4
			1889-93	13	5	+	8
			1897-1901	17	3	+	14
Norway	100,000	2,300	1877-81	—	2	—	2
			1889-93	1	5	—	4
			1897-1901	03	27	—	267

N B —Owing to sources of error which need not be explained in detail, the above figures relating to exports and imports must be taken as rough approximations only. The chances of error are less, as a rule, when the growths of trade in different countries are compared than when the absolute figures for different countries are compared.

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